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VOL. XXXI

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No. 5

## ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding  
that they are contributed exclusively to THE LARYNGOSCOPE.)

### SOME INDICATIONS FOR OPERATION ON THE NASAL SINUSES IN CHILDREN.\*

DR. L. W. DEAN AND DR. M. ARMSTRONG, Iowa City, Iowa.

Operative procedures for nasal sinus disease in children are not often indicated. The acute infections of these cavities are readily cured or disappear of themselves. Those cases which are classed as chronic empyemias yield much more readily than in the adult to non-operative procedures. This is due to two things: first, the age of the patient excludes long chronicity; second, at this age nasal obstructive lesions are not common.

During the last three years we have made a routine examination of the nasal sinuses of 1108 infants and children under 14 years of age. A rather large number of chronic empyemias have been diagnosed. Most of these have been apparently cured by the removal of diseased tonsils and adenoids. Approximately 80 per cent of our cases have had this favorable termination. Even some hemolytic streptococcic infections of the sinuses have disappeared after this operation without further treatment. The hemolytic streptococcic infections we have found to be particularly resistant to treatment.

Cases associated with atrophic rhinitis and syphilis we have not found to be so beneficially influenced by this procedure. We have found, however, sinus disease in these two classes of cases to rap-

\*Read before the Forty-second Annual Congress of the American Laryngological Association, Boston, May, 1920.

idly improve with simple ventilation and drainage together with the usual local and general treatment. In syphilitic cases this improvement has been especially marked. When treatment without operative procedure has failed it is only in very rare instances that extensive operations are indicated. Certainly they should never be resorted to in children unless there is imperative need of immediate removal of the infection or if after months of treatment combined with the minor operative procedures for ventilation and drainage a marked chronic empyema persists.

While the pathology and the systemic complications are the principal factors in determining the need of these extensive operations the size of the sinuses in influencing the pathological changes is an important factor. We secure this information regarding their size from the X-ray plate. The findings are very often surprising. As a diagnostic procedure in children the X-ray examination is not accurate. Since July 1, 1919, in 197 cases in children with blurred antra only 81 were found to be diseased on culture.

At the recent meeting of the Southern Section of the American Otological, Laryngological and Rhinological Association I reported a case of hemolytic sphenoidal sinus disease in a child 5 years and 5 months old. In reporting the case a mistake was made in the age, it was stated to be 7 years. This patient had an extensive operation with the hope of aiding a very severe nephritis. The operation was only advised after treatment had failed. The condition of the patient was most critical. The pediatricist desired thorough cleaning out of the diseased sinuses. A Sluder operation was attempted under gas and oxygen anesthesia, the anesthetist maintaining a perfect anesthesia with the cone over the mouth alone. The immediate effects of the operation were only beneficial so far as the general condition of the patient was concerned. Unfortunately the nephritis was not affected and since the case was reported the patient died.

At the autopsy in this boy of 5 years and 5 months, in the right side was found a sphenoidal antrum 18 mm. wide, 10 mm. deep with an antero-posterior diameter of 19 mm. The left sphenoidal antrum was 13 mm. wide by 12 mm. deep with an antero-posterior diameter of 15 mm. These very large sinuses were filled with a hyperplastic edematous membrane. The membrane was so thick that when the large sphenoidal antra were opened they were found completely filled with the smaller membrane—much of the swelling was due to anasarca of the hyperplastic membrane. The remnants of ethmoidal cells that had not been removed were similarly



diseased. The autopsy showed that the operation was not as thorough as I had anticipated and suggests the necessity of improvement in our operative technique. Microscopical findings were as follows:

Grossly the mucous membrane lining the sphenoids appears to be very edematous. It is very much thickened, translucent, and of a soft gelatinous consistency. On microscopic examination it is found to be covered with ciliated columnar epithelium. The tissue interspaces are enormously increased in size and are filled with a non-staining substance. Throughout the entire tissue is a marked increase in round cell infiltration. This is particularly marked about the blood vessels. The blood vessels are quite prominent and are crowded with a large number of polymorphonuclear cells which may be seen within the tissue interspaces and especially just below the basement membrane and between the epithelial cells. Some are also seen lying free upon the surface.

Tissue curreted from the ethmoid cells is also edematous and on microscopic examination shows a more marked inflammatory reaction than that seen in the sphenoids. There is an extensive infiltration of round cells and a marked hyperplasia of connective tissue elements. In some places the columnar epithelium has been replaced by epithelium of the cuboidal type. In other places the epithelium has been replaced by granulation tissue leaving an ulcerating surface. At several points where granulation tissue is found in mucous membrane it extends into the bone in such a way as to leave no doubt that the bone is involved in an inflammatory process.

We wish today to report three cases where after treatment of the nasal sinus disease together with ventilation and drainage of the sinuses when indicated, the systemic infection was not controlled. We are firmly convinced that the exigencies of the situation and the result secured justified the procedures adopted. In each of these cases the Wassermann test on the blood was negative; the Von Pirquet reaction was negative and guinea pigs injected with material from the nasal sinuses did not develop tuberculosis.

Two of these cases were discussed before the Chicago Oto-Laryngological Society and one before the Southern Section of the American Otological, Laryngological and Rhinological Association. We are now prepared to report the end results.

In operating upon the nasal sinuses in children we have not lost sight of the deleterious influence the development of the bones of the face that might result from the destruction of these cells in

young children. We have always held prominent the very important functions of the nose and only as a very last resort have injured structures that are essential to the performance of these functions.

Case I. D. M. Female, aged 8 years.

On September 15, 1916, when patient was  $4\frac{1}{2}$  years of age, she was referred to us by the orthopedic surgeon with a diagnosis of multiple infectious arthritis and to have a search made for the focus of infection. We found present chronic tonsileitis and adenoids. The tonsils and adenoids were removed. At that time, September, 1916, we were not accustomed to make a careful routine examination of the nasal sinuses in our multiple arthritis cases in children. We are of the opinion that in 1916 a nasal sinus infection was present, but overlooked. Following the removal of the tonsils and adenoids the arthritis continued gradually to progress and was not checked until the sinus disease was eradicated three and one-half years later. We feel this child would now be in a very much better condition if this sinus disease had not been overlooked. Because of this and similar experiences we always ask the pediatric or orthopedic surgeon to return cases sent to us for removal of foci of infection about the upper respiratory tract if a nasal discharge persists or if there is a suspicion that a focus of infection remains.

This patient was returned to our service on November 30, 1919, by Doctor Steindler, the orthopedic surgeon, because the progress of arthritis in similar cases had been checked by our finding and eradicating a nasal sinus infection.

The arthritis began when the child was  $2\frac{1}{2}$  years of age following an attack of measles. Since the removal of the tonsils and adenoids three and one-half years ago there had been a gradual increase in the arthritic condition. At this time the following joints are swollen, stiff and painful: Joints of fingers, both wrists, left elbow, knees, ankles, toes and neck. Her temperature ranges daily from  $98^{\circ}$  to  $103^{\circ}$ . She is patiently enduring almost constant pain. Even movements of the head are distressing.

*Examination of Nose and Throat.* Tonsils and adenoids clearly removed; pharyngeal membrane slightly inflamed; nasal mucosa reddened and inflamed; posterior end of each inferior turbinate hyperplastic; mucosa about the ostium of sphenoid on each side thickened and edematous; it contains numerous dilated blood vessels. X-ray shows slight blurring of the left antrum of Highmore;

it shows a very large sphenoidal sinus for a child of 8 years; it suggests that the mucosa of the sphenoid antrum is thickened; at times nasal discharge was found.

On December 12, 1919, examination and culturing of the nasal sinuses gave the following results: Highmorian antra contained no macroscopic pus. Cultures developed a very sparse growth of streptococcus viridens, practically a negative result. The right sphenoidal antrum was about 11 mm. long. By sounding, its wall was found to be roughened. It contained macroscopic pus. Cultures gave a hemolytic streptococcus which when injected into a rabbit caused death in forty-eight hours. From abscesses in the endocardium of the rabbit the same streptococcus was secured. Examination of the left sphenoid gave similar results. A rabbit injected with the hemolytic streptococcus secured from the left sphenoid became critically ill but did not die. In three weeks the animal developed arthritis of the left foot and left hip.

Energetic treatment of the sphenoidal disease for fifteen days resulted in no improvement of temperature or arthritis.

Because of the difficulties we have experienced in the past in eradicating hemolytic streptococcic sphenoidal disease in children when it was complicated by multiple arthritis and because of the necessity of eradicating the focus of infection as soon as possible a Sluder operation right was performed on December 12, 1919, and on the left January 8, 1920. The posterior ethmoidal cells were but slightly diseased. The sphenoidal antra contained pus; they were lined by a very thick pyogenic membrane.

The report of the microscopical examination of the lining membrane of the right sphenoidal antrum was as follows: It showed very marked pathological changes. In some portions the epithelium has been entirely denuded, the surface being covered with a dense fibrous tissue; other points are covered with granulation tissue. The epithelium which remains, varies from a ragged irregular ciliated columnar to a stratified cuboidal. The basement membrane is very prominent; the mucous glands are hypertrophied; there is an enormous increase in connective tissue. A marked round cell infiltration may be noted and many plasma cells and pus cells are packed into some areas. The mucous membrane is from ten to twenty-five times thicker than normal. This corresponds to what Skillern (1) calls the hyperplastic type with ulcerosus.

The treatment of the sinus disease was continued after the operation.

Six weeks after the second operation the temperature curve was almost normal and the patient was very much improved. For four months after the second operation the patient remained in our service for treatment and observation. Today she is a changed girl; she is happy and contented; the suffering is gone. The swelling of the joints has diminished; there is no pain from pressure on or motion of the joints. The patient can walk some, something she has not done for months. The movements of the head are becoming rapidly better. The temperature curve is normal. In a few days she will be returned to the orthopedic service for physiotherapy, etc.

Case II. R. F. Referred by Dr. Steindler on June 5, 1919, for diagnosis and removal of foci of infection. His diagnosis: multiple infectious arthritis.

Patient, white, male, aged 12 years. He is confined to his bed. He is very thin and anemic. He gives the impression of constant suffering. He takes cold easily; he has no nasal discharge or obstruction; he has occasional attacks of sore throat; tonsils twice operated, two years ago resulting in improvement of his rheumatism. Most of the joints including those of cervical vertebra and temporo-mandibular articulation are involved. Heart and kidneys are apparently normal. Daily temperature from 98.8° to 100.2°.

*Examination.* There is a remnant of faucial tonsil in each side with a fair-sized bunch of adenoids. Cervical glands not palpable. Some muco pus in each side of the nose. The left antrum of Highmore was blurred in the X-ray plate.

On January 10, 1919, the remnants of tonsils and the adenoids were removed; the Highmorean antra were cultured, the washings were reported sterile.

From the tonsils a hemolytic streptococcus, a staphylococcus and the streptococcus viridans were recovered. A rabbit injected intravenously with 1.5 cc. of a forty-four-hour culture of the hemolytic streptococcus developed arthritis in each shoulder joint. From the synovial fluid in the joints a hemolytic streptococcus was cultured. No gross changes were apparent in any of the internal organs.

The patient was returned to Dr. Steindler for observation, with the request that he be returned for further examination if there seemed to be a focus of infection remaining.

On May 4 Dr. Steindler returned the patient to our service. He reported that while the condition of the patient was improved, he still has acute exacerbations of this arthritis, and the daily slight rise in temperature persisted.

*Examination of Nasal Sinuses.* Left antrum of Highmore contained pus so thick it could only with difficulty be aspirated; the washings from the right Highmorian sinus showed no macroscopic pus. The bacteriological examination of the washings from the sinuses revealed a hemolytic streptococcus from the right Highmorian antrum; a hemolytic streptococcus from each fermented lactose and salicin; neither fermented mannite or inulin.

A rabbit was injected intravenously with 3 cc. of a twenty-four-hour culture of a hemolytic streptococcus from the left antrum. It developed arthritis in the right elbow joint, also in the left ankle joint. The para-nasal sinuses of the animal were negative on culture; the lungs and pleura were normal; there was fibrinous pericarditis; there were parenchymatous changes in the liver; the spleen and kidneys were apparently normal. A hemolytic streptococcus was cultured from the elbow joint.

On May 5 a deflected septum which was present was corrected. The nose was treated using negative pressure and nasal irrigations of normal salt. Patient was out of doors as much as possible.

Following this operation the patient's general condition improved but the temperature and joint condition remained as before.

On May 23 the Highmorian antra were drained through the inferior meatus. The inferior turbinates were rotated upwards, and an opening made in the antro-meatal wall. The turbinates were replaced and the operation completed without sacrificing any turbinate tissue. The Highmorian antra were irrigated with sterile normal salt solution followed by 1 per cent argyrol daily, and occasionally with 5 per cent silver nitrate solution.

One month later, on June 21, the patient insisted that the joints were better. His daily elevation of temperature to 100° persisted, however, and the appearance of the patient was bad. He had developed a bed sore which caused much distress. There was only a little discharge from the Highmorian antra.

At this time pus was detected coming from the region of the left sphenoid. The lingual tonsil had been frequently examined—it always appeared normal.

On June 23, 1919, the left sphenoid and left ethmoids were operated and found to be badly diseased. The wall of the sphenoid was rough. A polyp was removed from the anterior ethmoidal region. It was covered with columnar epithelium; it contained mucous glands; it was distinctly inflammatory, as shown by the large number of round cells below the basement membrane and around the blood vessels and glands; it was very edematous; the connective tissue

cells have undergone mucoid degeneration. A very careful examination failed to reveal any definite evidence of involvement of the upper posterior sinuses on the right side. Consequently they were not disturbed. The nose was treated daily.

On August 23, the patient reports he is feeling fine; he can move his head better; the joints are not painful; there are no evidences of acute trouble in the joints. However, the patient looks bad; he gives the impression that he is gradually failing; daily afternoon temperature is between  $100^{\circ}$  and  $100.4^{\circ}$ . The ethmoidal and sphenoidal regions are perfectly clean. The opening into the Highmorian antra are patent. Some muco pus is present each morning in washings from the antra. The washings still contain the hemolytic streptococcus.

On August 25, a Denker operation was performed on each Highmorian antrum.

Findings in the right antrum: Caries of the floor. Mucous membrane much hypertrophied. Three good-sized polyps were removed. The polyps showed mucoid changes and marked purulent inflammatory changes.

The findings in the left antrum were similar to those of the right.

A hemolytic streptococcus was secured from each antrum. A rabbit inoculated with 4 cc. of culture twenty-four hours old, became ill; it would not eat for two days; it gradually recovered; no arthritis was noted.

Following this last operation the patient improved wonderfully. The temperature in five weeks was normal and remained so, except for the slight exacerbation so common in children. On November 26, approximately eleven months after he was admitted to our service, he was returned to the orthopedic ward. As the result of the nine months of study of, operation on, and treatment of this boy the progress of his arthritis has ceased. It is now eighteen months since he left our service. During that time he has had no acute exacerbation of his joint trouble. He has been receiving orthopedic treatment for the ankylosed joints. He still goes about using his crutches but in a very energetic way. I have seen him playing football on his crutches, not being concerned over the possible traumatism of his joints.

All of his teeth are vital. The only damage done his nose was the removal of the left middle turbinate.

Case III. C. M. Referred by Dr. Steindler on February 11, 1919, for finding of and removal of foci of infection. His diagnosis: Multiple Infectious Arthritis.



Patient white, male, aged 13.

The trouble began during the preceding summer without apparent cause. The first thing noticed was the gradual development of stiff knees with some tenderness. In the following December after influenza the ankles and elbows became involved; the knees began to swell and were tender; the patient was unable to stand upon his feet because of pain in the ankles. There is no history of sore throat, tendency to attacks of acute rhinitis or of nasal obstruction. There is considerable nasal discharge.

Patient is confined to bed; he looks very bad, giving the impression of constant suffering. Almost every joint in the body swollen and painful on pressure. The tempere mandibular joints are swollen so that the incisor teeth cannot be separated by more than one-half inch. The cervical vertebrae are ankylosed, the head being fixed tilted to the left with the chin pointing to the right. The daily range of temperature is from  $98.8^{\circ}$  to  $101.2^{\circ}$ .

*Examination.* Nose, small spur right and left. Muco pus in each side of the nose.

X-ray shows the Highmorian antra blurred—other sinuses clear.

Washings from antrum right, discarded because of an error in technique. Left, sterile.

Throat, chronically diseased tonsils; moderate-sized adenoids.

*Diagnosis.* Chronic tonsillitis and adenoids with sinus disease not definitely diagnosed.

It was recommended that the tonsils and adenoids be removed, and the patient placed under observation.

On March 18, 1919, the tonsils and adenoids were removed. From the tonsils a hemolytic streptococcus was secured.

On April 12, the patient developed an acute exacerbation of his arthritis and a second search for foci of infection was made. The daily elevation of temperature had been constant. The lingual tonsil appeared reddened; this seemed to be just a part of the general inflammation of the throat.

The naso-pharyngoscope showed the neighborhood of the ostia of the upper posterior sinuses to be edematous and reddened. No pus could be seen coming from the sphenoids or posterior ethmoids.

Washing and aspiration of Highmorian antra, gave from the right, a bloody fluid; from the left, muco pus. Cultures from the right antrum were sterile; from the left, a hemolytic streptococcus was secured. Two cc. of a forty-eight-hour culture injected intravenously into a rabbit developed in four weeks, arthritis of the ankle joints.

An opening for ventilation and drainage was made through the inferior meatus into the Highmorian antra. The after-treatment was irrigation with sterile normal salt followed by argyrol 1 per cent, occasionally 5 per cent silver nitrate was used. Coffins treatment was given twice daily.

Two weeks following the operation the patient was no better; his appearance was bad; the daily afternoon elevation of temperature from  $1^{\circ}$  to  $1\frac{1}{2}^{\circ}$  persisted.

On April 30, the upper posterior sinuses were again examined. Muco pus, very thin, was found draining from each sphenoidal region, along the posterior border of the septum. About the sphenoidal openings the membrane was thickened and there were numerous petechial hemorrhages. There were some flakes of pus secured from each Highmorian antrum. Cultures from each antrum and the superior meatus on each side of the nose have a hemolytic streptococcus.

Rabbits inoculated intravenously with 3 cc. of a twenty-four-hour culture of the organism from the antra produced arthritis of the knee and shoulder joints. The hemolytic streptococcus was recovered from these joints.

On May 1, the sphenoids and posterior ethmoids were drained as thoroughly as possible without removing the middle turbinates, and the openings into the antra were enlarged. There was pus in each sphenoid. The after-treatment was the same as before. The patient developed an ear infection which complicated the situation for several weeks.

The diet was carefully watched and the patient was out in the sun on all favorable days.

A purulent discharge persisted from the sphenoidal and ethmoidal region.

On June 18, a hemolytic streptococcus secured from the Highmorian antra, produced arthritis in a rabbit.

The patient's condition was gradually improved, but the daily elevation of temperature persisted, showing that the process was not checked.

On July 21, the patient developed an acute pharyngitis. The upper posterior sinuses were discharging muco pus.

On July 23, a Sluder operation was performed on the ethmoids and sphenoids on each side. Tissue removed from the ethmoidal region showed increase in cellularity; many wandering cells, lymphocytes, and polynuclear cells. Most of the surface covered with columnar epithelium; at some points stratified squamous; and in

some areas the surface is denuded of epithelium and covered with pus cells.

In four weeks the upper sinuses were clean, but the antra of Highmore still contained the hemolytic streptococcus.

On August 24, the patient was much improved; afternoon rise of temperature to 100°; sphenoidal regions clean; some pus in each Highmorian antrum.

On August 27, a modified Denker operation was performed on each side, and the lingual tonsil was cauterized.

Polyps and necrotic bone was found in each antrum. A rabbit injected with a hemolytic streptococcus secured from the antra of Highmore, developed arthritis.

In six weeks the nose and sinuses were clean; the temperature was normal; the joints much improved. The patient has increased much in weight and says he is feeling fine. He spends much of his time playing.

From October 1 to November 28, there was no trouble in the nose or throat. The joints continued to improve.

On November 28, there was no tenderness of the joints on pressure, and the patient was returned to the orthopedic service for the treatment of ankylosed joints.

In this case it was necessary to sacrifice each middle turbinate; the inferior turbinates were preserved practically intact. Today this patient is remarkably improved. He is plump; his appetite is good; he gets around rapidly on his crutches; he has had no acute exacerbation in his joints; he is still receiving orthopedic treatment.

With rather a large number of cases of multiple arthritis referred to the laryngological clinic, it has only been necessary to treat or operate the sinuses in a very few cases. When we have found nasal sinus disease present in this condition, and the etiological factor is the hemolytic streptococcus, we have found great difficulty in eradicating the nasal sinus disease as compared with non-complicated sinus disease in children.

We feel that all cases of systemic infection in children that are ordinarily due to foci about the upper respiratory tract, if not checked by the removal of diseased tonsils and adenoids, should come in the hospital for study of the nasal accessory sinuses. We have only been able to study them satisfactorily by having the patients in the wards, where they are under constant supervision.

If the nasal sinus disease is present, we find it necessary to hospitalize these patients for six to nine months in order to get satisfactory results. This gives the best opportunity for that careful study which must precede all operative work in the sinuses.

With the cases just cited, we feel that the focus of infection was in the nasal sinuses and that it could only be removed by operation on these sinuses.

The removal of middle turbinates and the destruction of sinuses have been justified by the results. In these three cases, if the foci had not been obliterated, the result would probably have been an ankylosis of all joints, utter helplessness, and a slow, painful death.

As a result of the work, our patients, although cripples, are well nourished, happy, free from pain, enjoy play, and with proper education will be self-supporting. These children are our best friends; their gratitude compensates us many times over for the time and work necessary for the proper handling of their cases.

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### THE MOSHER-TOTI OPERATION ON THE LACHRYMAL SAC.

H. P. MOSHER, Boston.

To date I have operated or supervised the operation of twenty-one cases in which a combined external and internal operation was done on the lachrymal sac and the nasal duct. The first case I did a year ago. This patient reports her operated eye as good as the sound eye. The other cases of the series were operated during the past six months. In the majority of the cases the results so far are so promising, that is, not only relief of the infection but of the epiphora—that the technic of the operation is here stated as a matter of record. As the operation was inspired by Toti, it may be fairly called, I think, the Mosher-Toti Operation, in spite of the fact that Toti's technic is markedly changed.

Summarized the operation is as follows: The first step is the removal of the anterior end of the middle turbinate.

The second step is the exposure of the lachrymal sac. This is done by an incision which lies about 6 millimeters from the inner canthus of the eye. It starts at the level of the crease in the upper eyelid which marks the summit of the globe, and runs downward

on the ascending process of the superior maxilla in a nearly straight line, parallels the bed of the lachrymal sac and stops 2 or 3 millimeters below the inner end of the lower rim of the orbit. It is very much the same incision as is used for excision of the sac, except that up to now I have usually made it a little longer. The sac is exposed and turned from its bed by entering the orbit above the sac and elevating the periosteum of the orbit from above downward. The periosteum of the inner wall of the orbit is elevated for some 2 or 3 millimeters beyond the crest of the lachrymal bone. The sac is made free and turned outward until the beginning of the nasal duct is clearly seen. In all cases so far, it has been easy to define the limits of the sac regardless of previous attempts at excision, or the presence of fistulae.

The third step is to break down the lachrymal bone in front of the crest. This is readily accomplished by a knife, a small flat chisel, or the end of a small punch. A sufficient opening is made in the lachrymal bone to permit the introduction of a small Kerrison punch or any similar instrument. With this the rest of the lachrymal bone in front of the crest is bitten away, and then the posterior edge of the ascending process of the superior maxilla where this makes the anterior half of the bed of the sac is removed. A bone opening is made into the nose at least equaling the height and width of the sac. Then with a small conchotome the inner wall of the nasal duct is bitten away to the level of the upper rim of the inferior turbinate.

The fourth step of the operation consists in the removal of the inner half of the lachrymal sac and the inner wall of the soft tissues of the nasal duct. The first is accomplished with forceps and scissors and the second with a conchotome. It is essential to leave the outer half of the wall of the sac because in this the common punctum is placed. In distended sacs the punctum is never endangered, but care must be taken in cases where the sac is small. The mucous membrane of the nose is sacrificed where it presents in the bone opening and trimmed flush with its margins. The region of the nose opposite the bone opening and into which from now on the punctum is to drain, is made free from tags of middle turbinate and overlapping ethmoidal cells. This is done in order that the granulations which occur during the healing process may not encroach on the punctum, and in case this is surrounded by granulations caused by the suppuration in the sac—and I have encountered this condition in two instances—seal it off and defeat the purpose of the operation.

After replacing the soft tissues I have usually sutured the skin incision loosely and paid no attention to the underlying periosteum. Dr. C. T. Porter, who has helped me in some of these operations, and who has done three cases of his own by this method, has sutured the periosteum of the ascending process of the superior maxilla to the anterior edge of the remaining part of the sac. He also makes his incision as straight as possible, feeling that sewing the periosteum and a straight incision results in a less conspicuous scar. Other operators in this neighborhood who have tried the operation above described, have omitted the removal of the anterior end of the middle turbinate. I am not yet convinced of the wisdom of this modification.

The Mosher-Toti operation differs from the original Toti operation in that no attempt is made to join the lachrymal sac to the nasal mucous membrane by making equal and opposite openings in each and anastomosing them by sutures. Toti preserves the sac as a sac. The chief objection to this—Verhoeff—is that the new opening into the nose may narrow after the fashion of anastomotic openings generally, and reproduced the old order of things. The essential modification that I have made in the Toti operation is to destroy the sac as a sac, preserving only the essential part of it—namely, the outer wall and the punctum. I also sacrifice the nasal mucous membrane where it is exposed by the bone opening.

As was said in the beginning of this notice the results obtained by the combined external and internal operations on the lachrymal sac have been most encouraging to date. More time, of course, must elapse before their permanency can be settled.

The great advantage of the operation is that it not only does away with the infection of the sac, but at the same time cures the epiphora. It is simple to execute, and is done entirely by sight. So far no case of orbital infection has followed it. After a number of successes with the intra-nasal operation on the sac I abandoned it in favor of the combined operation because in one case the orbit was infected and the eye nearly lost. This caused me to try the combined external and internal operation. After experiencing the relief afforded by working by sight, after sensing the safety of this method, I prefer not to work again in the dark.

828 Beacon Street.



## JUVENILE NASO-PHARYNGEAL FIBROMA—REPORT OF CASE TREATED BY KOCHER'S OSTEO- PLASTIC METHOD.\*

DR. GREGORY A. WALL, Tulsa, Okla.

Tumors of the naso-pharynx are limited practically to three kinds, viz.—fibromata, sarcomata and chondromata. Sarcomas are rare tumors in this location, according to Bland-Sutton, and they give a train of similar symptoms to fibroma, but the pain is usually agonizing at some stage of the growth, causing intense frontal headache and recur unless completely removed. The age incidence is about the same in both.

Chondromas are very rare tumors in this locality and are characterized by their cartilaginous hardness and are prone to occur after removal, and they are usually mixed tumors.

Fibromas of the naso-pharynx, according to Ewing\* are rare and peculiar tumors, occurring chiefly in the male between the ages of 10 and 25 years. It is a very firm, almost cartilaginous tumor, which appears in the vault of the pharynx and grows in several directions. According to Bensch, it produces an intra-pharyngeal tumor when arising from the basilar fibrocartilages, the upper cervical vertebrae or the internal lamina of the pterygoid process; or an extra-pharyngeal growth when arising from the foramen lac. ant, or the sphenopaltine fossa. The intra-pharyngeal tumor extends forward into the nares and the adjacent sinuses, causing atrophy of the bony structures. From the sphenoidal origin the growth extends down between the masseter and the mucosa; or it pushes between the pterygoid and styloid muscles into the temporal fossa and forward into the malar region; or through the inferior orbital fissure into the orbit, or by way of the superior orbital fissure or lamina cribosa it reaches the cranial cavity. From these points the course from the two seats of origin overlap. In structure the tumor is composed of dense fibrous and elastic tissue, which rarely shows calcification, cartilage or bone. The cells are round, spindle or star shaped fibroblasts which are scanty except in certain foci of young connective tissue, when they may be so numerous as to suggest fibrosarcoma. Mast cells and plasma cells may be present. The vessels are numerous (angiofibroma) and sometimes cavernous.

\*Ewing: Neoplastic Diseases. 1919. Page 164.

Involution changes follow thickening and hyalinosis of the vessel walls, the stroma becoming hyaline and the tumor undergoing necrosis or fatty degeneration. The course is of an actively growing tumor which disturbs various functions by pressure, and leads to anemia from hemorrhage, suffers ulceration and local infection, and may prove fatal in this way, or from cerebral disturbance. Metastases are not observed. A remarkable feature of the tumor attested by many observers, is the complete spontaneous regression after partial removal (Bensch, Konig, Bruns, Grunwald and Zarniko). This event seems to occur chiefly at the end of the period when the tumor may develop, i. e., the twenty-fifth year.

There is thus illustrated a form of immunity (natural) which may be referred to natural anatomic changes at the point of origin, from which alone the nutrition and growth is maintained. According to Bensch, the development of the male and female face and skull at puberty explains the predominance of the tumor in the male, while the completion of cranial development at the age of 25 years determines the spontaneous disappearance of the tumor. It is not clear that the tumor is always fibromatous in structure. Naab observes that sarcoma and chondroma may appear under much the same conditions. Ewing has seen a tumor corresponding in many particulars to the above description, but showing the structure of sarcoma with indistinct chondromatous qualities, so confusion with chondroma seems possible. Many of the tumors are myxomatous or myxosarcomatous and these recur persistently and are commonly fatal.

The symptomatology of naso-pharyngeal fibromas are those of tumors in this location, viz., obstruction to breathing, loss of taste at times, often headaches and mucous discharges from the nose, with epistaxis. Examination will show the tumor in the nasopharynx, appearing as a red, nodular, hard and highly vascular, slightly movable mass, at times though it may be fixed and have a wide base of attachment.

Bleeding on the slightest manipulation is usually very severe, often requiring tamponage to control it.

The diagnosis of the case herein reported as being one of juvenile naso-pharyngeal fibroma is based upon the clinical history and operative findings, and from the further fact that two years and six months have elapsed and there has been no recurrence of the growth, and there has been no more hemorrhage. At the time of the operation no microscopical examination was made of the tissues, due to the fact that the hemorrhage was so profuse and alarm-

ing, that time was at a premium in order to save the boy's life, and the particles of the tumor which were chiseled off were lost in the haste to get the operation completed, since the patient was showing a great amount of shock. So far as could be ascertained the tumor was not completely removed at the time of operation due to the extreme bad condition of the patient.

Following is the history of the case:

J. L. P., schoolboy, aged 19 years, weight 140 pounds, presented himself to Dr. Roth, of this city, February 10, 1916, with both nares plugged to control the severe epistaxis from which he had been suffering for the past five months. He was rather sallow complected and his nutrition was not good, and the doctor suspected a malignant condition. The packing was removed by Dr. Roth and adrenalin 1-1000 applied, to stop the hemorrhage, after which an examination was made. There was seen in the naso-pharynx on the left side posteriorly, a tumor about the size of a large pecan covering the Eustachian orifice, which bled freely upon the slightest manipulation. The patient was given tonics for the poor nutrition, and elixir chlorocalcium in an endeavor to increase the coagulation time of the blood. A more thorough examination of the growth, including an X-ray, showed that it came from the neighborhood of the sphenoidal sinus, and was sessile, precluding any possibility of removing it with a snare. Severe bleeding continued and the boy consulted the doctor from time to time during the year, who gave him treatment and packed the nares on several occasions to stop the hemorrhage. In spite of this the growth continued to increase in size and the bleeding was more profuse and constant. The patient began to show a marked anemia from the continued loss of blood, and his nutrition was failing. The growth had by this time reached the soft palate occluding the posterior nares and was hard, nodular and bled on the slightest touch. Latterly the hemorrhage was so profuse and constant that he would faint from loss of blood, when the nares were not packed tightly. The case was seen by the writer in consultation in January, 1917, and we agreed that in view of the fact that unless the hemorrhage was in some way controlled that he would die from anemia and exhaustion incident thereto, since it was not possible to remove it by the snare, we agreed to operate by Kocher's resection method. The patient and family were told of the seriousness of the operation, but they agreed to have it done, and the boy was sent to the hospital.

*Operation.* After the preliminary treatment of the case, an anesthetic was given. Drop ether was given during the ligation of the

external carotid artery after which the ether was given by the intra-tracheal method and continued throughout the operation, which lasted one hour. The technique of the operation is best given in Kocher's own words.\*

He says: "The freest access to the whole of the nasal cavity and to the roof of the nose and naso-pharynx is provided by a method we have introduced, namely, by temporary reflection of both upper jaws. The technique is fairly simple: The upper lip is split into the nostril near the philtrum, the mucous membrane in the fold between the jaw and the lip (and cheek) is divided sufficiently to allow of a chisel being applied above the alveolar margin so as to cut through the anterior wall at the floor of the antrum, the chisel being provided with a short protecting guard on one side.

There is no resulting injury to the mucous membrane of the posterior wall, while the vessels and nerves running forwards to the horizontal plate of the palate remain undivided. The alveolar margin and palate are divided with a broad and (the writer used a Hayes saw) very thin chisel exactly in the middle line in the interval between the incisor teeth. The soft palate is also divided and the edges are forcibly pulled apart with strong hooks. The mucous membrane of the nose is divided, the vomer pushed aside (or cut across) and the turbinate bones are excised if they hamper the operator. The access to the base of the skull by this method is better than is provided by any other operation, and although less room suffices in cases of pedunculated fibromata, we consider this method necessary in dealing with tumors that have a broad attachment. The operation provides excellent access, with the great advantage that the resulting deformity is nil, only a very slight scar being left, and at the most the incisor teeth next to the saw cut may be slightly loosened. The two halves of the palate are then carefully approximated and its coverings as well as the soft palate, are united with sutures. (We wired the teeth together with bronze aluminum wire, thus approximating the two halves of the jaw and the union was perfect). The raw surface at the base of the skull must be well packed and the end of the packing brought through the nostril. Surgeons are agreed that the operation gives freer access than is provided by any other method, and there is least subsequent injury and no disfigurement, because the palatal processes and the soft palate unite very readily. The severe bleeding which occurs is not due to the operation, so much as it is to the

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\*Kocher: Text-Book of Operative Surgery; Vol. II, page 399.

condition by which it is occasioned, i. e., the vascularity of the broadbased tumor.

## COMMENTS.

The patient left the table in great shock from loss of blood. He was put to bed with foot raised and the usual remedies given and surrounded with hot water bottles. In the course of a few hours he reacted very nicely and went on to an uninterrupted recovery. The nasal packing was gradually removed and the mouth and nose kept clean by antiseptic douches and washes. The packing was entirely removed by the fifth day, when there was no more bleeding. The patient was able to eat soft diet at this time and the jaws had already begun to unite firmly and without appreciable scar. There was primary union in the soft parts and the wound was entirely healed in ten days.

The writer would, if another occasion arose to do this operation, tie permanently the external carotid artery on the affected side, and put a temporary ligature on the corresponding artery of the opposite side, for the hemorrhage in this operation is very alarming, besides being very annoying and interferes with the proper technique of the operation.

A recent letter with accompanying photograph was received from him on April 24, 1919. He states that he now weighs 173 pounds, and is serving in the navy, and that he is perfectly well and has had no further recurrence of the trouble.

Mayo Building.

## POLYPOID DEGENERATION OF THE LINING OF THE ANTRUM OF HIGHMORE.

DR. FRANCIS P. EMERSON, Boston, Mass.

For many years certain antiphylactic reactions manifesting themselves as asthma, hay fever, etc., have been attributed to some nasal reflex. Careful observers have failed to agree on any definite pathology. Clinical cases have been reported as cured following the restoration of about every abnormality of the nose. Perhaps the one pathological condition that has been the most constant was a polypoid degeneration of the middle turbinal mucous membrane. This is assumed by most clinicians to be secondary to a suppurative ethmoiditis. As the purulent process subsides there is supposedly left a low-grade infection of the lining membrane which becomes the seat of a degenerative polypoid process. Early in the development of the polypoid masses there is apt to be vasomotor disturbances that may or may not subside as the disease progresses. Schadle, in 1907, wrote on the relation of the antrum of Highmore to hay fever and some of the more common forms of catarrhal and nervous disturbances of the nose. In this report he dealt with non-suppurative conditions in which there was a free ostium and the relief of symptoms followed the use of normal salt solution through the natural opening. No attempt was made to inspect the antral cavity. No one since has verified his findings. Some recent cases of the writer seem to indicate that there was a basis of truth in Schadle's observations, although much more radical means are necessary to effect a cure. The findings in these cases also show the relation of the antral pathology to that found in polypoid ethmoiditis. That the lining membrane of the antrum should undergo the same changes as take place in the middle fossa would seem to be obvious. The difficulty in making a diagnosis, however, is increased from the fact that no pus is present. There has also been a secondary atrophy of the lining membrane so that transillumination and the X-ray may be of no help. In one of the cases reported the polypoid mass was within the antrum and the middle turbinal body looked normal. The discharge may not help us, as the antrum may be empty, or contain a colorless serum. In some cases gelatinous material can be washed out which is diagnostic. We may be helped by the following considerations: First, a careful history re-



veals the fact that the patient has repeated head colds in which the antrum on one side always seems different from the opposite side, although there is no pain or tenderness. Degenerative changes around the middle turbinal may or may not be present. Second, in some cases gelatinous masses can be washed out through the natural opening. Third, when serum is present in considerable amounts the X-ray will show a cloudiness on the affected side.

The mental disturbance is not to be ignored. It is easy to see that there are not clear-cut indications for operative interference. The case must be diagnosed partly by exclusion, partly by the history, the presence of gelatinous masses or a cloudy X-ray, etc. More often the patient must be studied over some little time. It is not probable that every case of vasomotor rhinitis or polypoid degeneration of the ethmoid has an involvement of the antrum with degenerative changes, but the writer feels that he has overlooked a great many.

*Treatment.* No treatment is effective except removal of the diseased tissue. If one elects the canine fossa route, on removing the cortex the antrum may be found filled with a colorless, sticky serum. The bottom of the cavity may be filled with a gelatinous mass or the cavity may be empty, the lining membrane atrophied and polypoid masses present. In a large number of cases it will be necessary to exenterate the ethmoid labyrinth, and, what is equally important, watch the case until the polypoid and atrophied tissue has been replaced by a non-infected membrane. In one case in which the diagnosis was made by washing out a gelatinous mass there had been no antrum history and no discharge. The corresponding Eustachian tube was repeatedly re-infected and the antrum discovered by exclusion. Operation was followed by so foul an odor that the patient could hardly be induced to eat. This case had no odor or pus before operating. These cases were all chronic, representing the terminal stage. The point that should be emphasized is that if the atrophy is far enough advanced most of the diagnostic evidence of a chronic antrum disappears. There is no redness, puffiness and tenderness of the cheek and lower eyelid. The inferior turbinate is not hyperemic and is not covered with purulent secretion. There is no odor and the normal opening is more free than usual. In discussing these cases we must agree on those represented by a definite pathology in which polypoid degeneration is well advanced. Of these cases, and especially when associated with vasomotor rhinitis it is probable that we have overlooked a good many.

*Conclusions.* In every case of long standing polypoid degeneration of the ethmoid labyrinth, operative interference should be followed by inspection of the antrum on that side.

In washing out the antrum of Highmore a residual gelatinous mass is suggestive of polypoid degeneration of its lining membrane.

There may or may not be evidence of degenerative changes in the middle nasal fossa.

Such cases are subject to subacute exacerbations without pus formation, local tenderness, or redness.

The irritating discharge of colorless serum following such exacerbation may be the cause of the vasomotor rhinitis or what seems to be a mild infection of any part of the naso-pharynx or Eustachian tube.

The natural opening is more free, than normal.

There may or may not be any diagnostic help from transillumination or the X-ray. It is very suggestive when the affected side transilluminates more clearly than its fellow.

*Case I.* E. S. A., June 4, 1919; 65 years, retired. Past History. A. D. Thirty years ago showed beginning deafness. Did not progress until ten years ago. Colds occasionally. No catarrh. No tinnitus.

*Examination.* B. Membrana tympani dull, retracted and light reflex broken.

R	W. V.	L
1 1/2/25	Rinne	1/2/25
7"	U. L.	15"/
N	L. L.	N
64		32

*Tonsils.* Cryptic disease.

June 30, 1919. Tonsillectomy.

December 29, 1919. Following his tonsillectomy and after treatment of the naso-pharynx the right ear improved for the whispered voice from 1½ feet to 9 feet. Patient then had an acute infection followed by a left salpingitis and marked indrawing of the membrana tympani.

*Eustachian Tube.* Re-infected four times.

In looking for a cause the left antrum was washed out and two drams of a gelatinous material recovered. No history of antrum trouble. Transillumination clear. X-ray negative. Teeth negative. Naso-pharynx negative.

*Diagnosis.* Acute exacerbation of a chronic antrum probably with polypoid degeneration.

January 14, 1920. Radical antrum operation through canine fossa. Antrum filled with sticky serum. Polypoid mass on upper and inner wall.

Recovery uneventful, except for very foul discharge for a week.

January 30, 1920:

R	W. V.	L
9/25	256C	Shout
15/7 R	+ < W	12/17
27/15	512C <sup>2</sup>	20/14
45/13	1024C <sup>3</sup>	22/13
10/1	2048C <sup>4</sup>	8/2
64	L. L.	64

*Case II.* Miss H. T.; May 22, 1914; 11 years, school.

*Past History.* Whooping cough, measles (7 years), chicken pox. Cervical adenitis two years ago. Abscess in left groin five years ago. Two years ago was treated for bladder trouble. Bronchial asthma since 9 years of age. Tonsils and adenoid operation two years ago. Headaches, often.

*Treatment.* Tonsil and adenoid operation.

January 26, 1920. Has had asthma summer and winter since 9 years of age. Never able to run or exercise without difficult breathing. Colds start attacks. Has not had a complete year at school for years. Went to California two years ago for three months.

*Examination.* Face undeveloped. Teeth negative.

*X-ray Report.* Plates made of the sinuses show a very marked increase in density over the *left* antrum.

*Transillumination.* Dark over *right* antrum. Pupil reflex not present on either side. Naso-pharynx negative.

*Antiphylactic Reaction.* Tests show sensitiveness to streptococci, especially viridins and hemolytic.

*Operation.* February 2, 1920. It has been the writer's experience that transillumination was more reliable than the X-ray. In this case the history and examination supported the transillumination findings.

February 2, 1920. Right radical antrum operation. General diffuse dark redness over right antrum, but no thickening of lining of cavity. No pus or polypi found. Asthma attack and soreness of right side of the throat when pus accumulated in operated cavity.

February 20, 1920. Slight asthma attack when antrum needed washing.

*Left* antrum explored and found negative.

## THE DIAGNOSIS AND TREATMENT OF MAXILLARY SINUSITIS.\*

DR. HOWARD V. DUTROW, Dayton, Ohio.

I wish to ask your indulgence of this paper, only for the reason that I feel that I have been able in the course of my work to make some important, if not altogether new observations, in the diagnosis and treatment of maxillary sinusitis.

Infection of the nasal accessory sinuses, both acute and chronic, have become very important and far-reaching in their relationship to the every-day practice of medicine. The maxillary sinus on account of its peculiar anatomical construction and its close proximity to the teeth makes it the most frequent offender. The dental profession has been aroused from its lethargy and is now most active in the recognition of pathology in the antrum of Highmore.

*Incidence of Infection.* The incidence of infection has become very high during the last two years due in part to the great epidemic of influenza, and the two or three succeeding milder epidemics which predisposed to infection of the nasal accessory sinuses. A great many infections can be traced directly to the recent activity of the so-called exodontists and dentists in general in extracting teeth. They not only discover a great many old infected antra but they also cause new infections by opening the antrum in a great many cases without knowing it, thereby creating a direct communication with the mouth through which food and infectious organisms enter, while some out of curiosity probe into the antrum without first taking the necessary aseptic precautions. Another great cause for the increase in the recognition of infected nasal accessory sinuses is to be found in the education of the laity as to the desirability of a general physical examination. During the course of this examination the patient usually passes through the office of a nose and throat man who should not consider his work complete without at least a thorough transillumination of the sinuses confirmed by an X-ray picture. Then, too, there is the increasing knowledge of the medical and dental professions at large of the ever-present possibility of the existence of foci of infection and the great benefit to the patient by their prompt removal. This I believe to be the great incentive governing physicians and dentists in their desire to ferret out the underlying cause in working out a diagnosis in obscure cases

\*Read before the Oto-Laryngological Section of the American Academy of Ophthalmology and Oto-Laryngology at its annual meeting in Kansas City, October 15, 1920.

of so-called rheumatism, organic heart disease, nephritis, neuritis, etc.

*Diagnosis.* The diagnosis of maxillary sinusitis is not always easy. It is very often in the obscure cases that we find the greatest amount of absorption of toxines taking place. It is very easy to diagnose a case which comes to us with one or both nostrils filled with pus and with one or both antra dark on transillumination which in turn is confirmed by the skiagraph. The class of cases which very often tax our ability in diagnosis is the one which comes to us in the terminal stage of infection, the acute infection having taken place years before, without recognition. At that time the mucous membrane is thoroughly infected and doubtless pus was present in large amount and made its escape through the ostium and the patient and his physician regarded it as a "cold" in the nose which would clear up in time. In a great many cases they do apparently clear up so far as the objective symptoms are concerned. The discharge ceases and the patient is as far as he can tell, free from his infection, but by this time a great change has taken place in the mucous membrane. It has become more or less degenerated and we have a varying quantity of granulation tissue which is constantly secreting a mucoid substance of changing consistency. What is still more important from the patient's standpoint in the way of sure and permanent relief is the fact, as pointed out by Dr. Beck before this academy a year or two ago, that we have the original infection still present, though in an attenuated or less virulent form in the mucous membrane, and sub-mucosa, and in the space between the mucous membrane and the periostium. The patients are referred to the rhinologist by their physicians because they have made a most thorough examination and were unable to find any cause for their complaint. These cases require a most careful history as to previous nasal infection or discharge and especially of their dental work, because it is my belief that fully from 65 to 70 per cent of infections of the antrum can be traced to a root abscess. At the time of our rhinoscopic examination we are very often unable to detect any free pus in the nose, but there is present a heavy viscid mucous in the middle meatus which finds its way into the post-nasal space and can be seen in the form of a string or band on the posterior naso-pharyngeal wall. Upon transillumination we will get a slight diminution in the illumination on the affected side and the pupil of the corresponding side will be dark. This is at once suggestive of pathology within the antrum and should be confirmed by X-ray.

It has been my experience that the X-ray findings have been consistent and with but one exception have confirmed the transillumination. In this case the skiagraph was taken first and showed definitely pathology in the right maxillary sinus. The history in this case was positive and the infection was of long standing and the patient had been operated upon four times but the Freer-Jackson transilluminator failed to indicate the slightest shadow. Both pupils transilluminated perfectly. There was a thick mucoid discharge in the nose and symptoms of anemia and general malaise. This case was especially interesting to me because the X-ray findings were positive and those of the transilluminator were negative. I think the explanation is to be found in the fact that the X-ray is far more sensitive to the diseased mucosa and sub-mucosa, while these structures offer little resistance to the passage of the light of the transilluminator. I have laid considerable stress upon this class of cases because they are not infrequent and are highly pathological in character and are the ones that are most likely to go undiagnosed. The various other methods of diagnosis are familiar to us all and need not be mentioned here. However, in passing, I wish to condemn the promiscuous use of the trocar and irrigation as a diagnostic routine.

This procedure is not without danger to the patient as reported by Redair Gording of Christiania, Norway, in his excellent article entitled "Serious Complications in the Puncture of the Maxillary Sinus," in which he reviews nine cases found in the literature with a fatal issue in four, and seven cases collected by himself with two fatalities.

I cannot see why we should subject our patients to this added risk when the findings are of so little value. If we have an antrum full of pus we know it positively by other means of diagnosis, and since the puncture and irrigation can only confirm what we already know, why should we use it? On the other hand, if the antrum is without pus but filled with diseased mucous membrane and masses of granulating tissue our irrigation will be returned practically clear and we have gained nothing. The puncture and irrigation to my mind is devoid of any curative value whatever. The X-ray must then necessarily be our sheet anchor in the diagnosis of these obscure cases of maxillary sinusitis. It is necessary to have the services of a good radiologist and we must learn to read and study the skiagraph with him in order to arrive at an intelligent and scientific conclusion.

*Advantages of the Caldwell-Luc Operation.* Both of these operators described independently a similar procedure. Caldwell in



New York in 1893, and Luc in France in 1897. After ten years' experience and observation of the various surgical procedures for the radical cure of maxillary sinusitis, I have been led to conclude that the Caldwell-Luc operation offers the greatest advantages. I need not burden you with the technique of this operation, but suffice it to say that it gives us a direct approach to the antrum through the canine fossa. The bone here is thin and can easily be drilled through with a Hartmann drill and the opening enlarged sufficiently to give us an excellent view of the interior of the antrum and all of its ramifications. This exposure to my mind is most important. Most of us at one time or another have attempted to work through too small an opening. I have heard the Caldwell-Luc operation unfavorably criticised in comparison with the Denker operation. I think you will agree with me that the Denker is rather radical in character and the destruction of bone unwarranted. Some have said that unless you did a Denker operation you were likely to leave pathological tissue in the angle of the sinus just behind its anterior wall. In doing the Caldwell-Luc operation I have not found the slightest difficulty, with a small and properly curved curette in cleaning out this angle. The ostium can be thoroughly inspected and the orifice curetted free from any polypi or granulations that are almost always present in varying amounts. In doing this operation every vestige of pathology should be removed from the sinus. There is one location in particular where I have seldom failed to find a large amount of granulating tissue and that is that portion of the sinus corresponding to the concave inner surface of the malar bone. The opening into the inferior nasal fossa can be made as large as it is deemed necessary, by carefully chiseling away the thin bone without perforating the nasal mucosa and without injury to the inferior turbinate.

Take plenty of time to perform the operation. Be thorough and accurate in every detail. Unless you do this you will surely have to operate many of these cases a second or third time. Do not subject your patients to the possibility of a subsequent operation in order to save a few minutes on the operating table. It behooves all of us as rhinologists to be conservative whenever possible in our nasal surgery. Lo! the thousands, yea, the millions of turbinates that have been sacrificed in years gone by. You will find that it is rarely if ever necessary to remove any of the turbinates if your nasal opening is low down and on a level if possible with the floor of the antrum and of the nasal fossa, and with its long diameter antero-posteriorly.

Doubtless all of us have seen cases in which the middle turbinate together with the ethmoid labyrinths had been removed, where a really widely destructive operation had been done for the cure of what seemed to be an ethmoiditis, which later proved to be an error in diagnosis and what really was a maxillary sinusitis. I have seen case after case, of what to the casual observer seemed to be an ethmoiditis, clear up immediately following a radical operation upon the maxillary sinus. I think you will agree with me when I state that the order in point of frequency of infections of the nasal accessory sinuses is as follows: First, maxillary; second, frontal; third, ethmoid, and fourth, sphenoid. I shall feel that I have been justified in presenting this paper if for no other reason than to impress upon your minds the importance of eliminating all possibility of an infected maxillary or frontal sinus, before you sacrifice the middle turbinate and the anterior and posterior ethmoid cells. In doing an operation upon a sinus nothing has been destroyed, nothing has been removed that has a physiological function to perform. The nose has a definite function to perform and when its structures are removed they cannot be replaced. Thorough ventilation and complete gravity drainage are great factors in the satisfactory surgical treatment of infected antra. The normal ostium is one of those freaks of nature wrought in the process of evolution which was in its proper relationship to the floor of the antrum when we walked on all fours but became malposed when we assumed the upright position.

*Post-Operative Treatment.* The after-treatment of the radical maxillary sinus operation consists of the immediate after-treatment and the treatment during convalescence. It is my practice to close the canine fossa opening by suturing the mucous membrane with catgut, and as a rule this operative wound needs no further attention except ordinary mouth cleanliness. I remove the packing through the nostril in from thirty-six to forty-eight hours. In putting in the packing a little care not to pack too tightly and to start the folds at the bottom of the sinus so that the layers come forward to the nasal opening will facilitate removal and be least uncomfortable for the patient. Edema of the face and soft tissues about the eye on the operated side varies in different patients and with the pathology present in the sinus. I have never seen it of serious consequence, though it occasionally is very annoying to the patient. The edema lasts from one to three weeks and cold applications are the only treatment necessary. There seems to be some difference of opinion as to the advisability of irrigating the sinus subsequent

to operation. It is my practice never to do so unless there is special indication, such as unusually profuse and foul discharge. In thirty-seven cases, irrigation was used only twice. In the first case there was a marked and prolonged reaction in the cheek lasting about ten days, when the sinus was irrigated to determine whether or not any pus had accumulated from the periostitis. The irrigation was returned clear and was not used again. The second case was a virulent staphylococcic empyema where the dentist some months previous had forced the root of a tooth up into the sinus. There was a small area of necrosis of the alveolar process from which came a foul discharge through the nasal opening. This case was irrigated every day or two for four or five irrigations when the odor disappeared and the discharge ceased. I do not believe in waterlogging the lining of the sinus. Another objection to repeated irrigation is the ever-present possibility of reinfection. In most cases the only local treatment after the removal of the packing is the daily cleansing of the nostril and inspection of the nasal opening into the sinus to insure its patency. The mucous or muco-serous discharge which is rather profuse for a few days gradually lessens and the nostril is dry in about ten days.

It has been my good fortune not to have had the serious ocular and brain complications of abscess mentioned by some authors, nor have I had bony necrosis of the sinus walls. The end results of a properly performed maxillary sinus operation are most gratifying when one notes the immediate improvement of the local point of infection and the general condition of the patient. Within a few weeks the patient loses the pasty, sickly, septic appearance, energy is much improved, weight gained, and color and appetite back to normal.

#### CONCLUSIONS.

1. That the incidence of infection is, for the reasons stated, greater than supposed, and that physicians and dentists generally are recognizing the existence of latent infected antra more and more each day.
  2. That many infected antra go undiagnosed because of the absence of subjective symptoms. That the trocar and irrigation is very limited as an aid in diagnosis, is not without danger, is without curative value and is misleading.
  3. That the Caldwell-Luc operation offers the most perfect permanent result if carefully done, with the minimum sacrifice of normal structures.
  4. That post-operative irrigation should be used only when definitely indicated and not as a routine.
- 1040 Fidelity Medical Building.

## ACUTE BILATERAL MASTOIDITIS. MENINGITIS ASEPTIC. OPERATION. RECOVERY.\*

DR. HAROLD M. HAYS, New York City.

R. M., aged 6, had been suffering from influenza for a few days before I saw her on April 3, 1920. Examination of her ears at this time, showed a bulging of both ear drums which necessitated immediate paracentesis. A culture taken from the pus from the middle ears, revealed the presence of the streptococcus hemolyticus. For four days following the operation, the temperature rose to 103°, and finally acute tenderness developed over both mastoids, with considerable sagging of the drums. In the right ear, the canal and drum looked worse than the left, and it was decided that this ear was more involved. On the night of April 8, 1920, a bilateral mastoidectomy was performed. Operation showed that both mastoids were entirely destroyed down to the sinus and dural plate. Neither sinus nor dura was exposed. The zygomatic cells were considerably involved. Cultures taken from the pus on both sides, showed the same organism that had been found in the middle ear. Both wounds were closed except at the lower angle where a small drain was inserted passing into the antrum. After operation, the child did not do well. There was considerably more discharge from both ears than there should have been, and she ran a temperature up to 102° and 103°. She seemed to have no vitality. Blood counts showed the white cells 20,000 with a polynuclear count running between 80 and 85 per cent. This continued for some time. At the end of two weeks the left ear healed up almost completely, but the right ear still continued to discharge, and there was an excess of granulations.

The child constantly complained of a very severe pain over the supra-orbital notch, radiating backward. This pain was so excruciating that it made her cry out in agony a number of times throughout the day. It was a question what was causing this pain, as there seemed to be no direct relationship between it and the ear condition. However, having had the same experience in other cases, I came to the conclusion that in all probability there was still some necrosis of the zygoma which had not been reached at the time of the operation. Apparently, last year, the streptococcus

\*Presented at the New York Academy of Medicine, Section on Otology, Nov. 12, 1920.

hemolyticus seemed to have the tendency to involve bone beyond the mastoid region, and this invasion frequently extended into portions of the zygomatic process which were not cellular in type.

In two other instances, where similar pains had been complained of, complicating conditions of the mastoid were found. At the end of three weeks Dr. Whiting was called in consultation and, after probing on the right side, he felt some bare bone in the upper region of the wound near the zygomatic cells, and confirmed my opinion that the advisable thing to do was to re-operate this ear.

On the night of April 17 the child was again operated upon. On exposing the wound, it was found to be filled with numerous granulations which extended into the antrum which also contained pus. The cavity was well cleaned out. The incision was then extended upward and forward over the zygomatic process and the investigation of the bone in this region was continued until there was no more evidence of any necrosed bone. In doing this work, a small portion of the dura was exposed, over an area adjacent to the upper portion of the tympanic ring. I did not feel, at the time of operation, that there was sufficient necrosis in the zygoma, to warrant the severe pain that this child had had, although there was no other way to account for it. After searching exhaustively for all foci of infection, the wound was lightly packed.

At the time of this second operation the child's temperature was 99.8°. The following day it rose to 102° and then was irregularly intermittent to the 22nd of April, that is, five days. The child was restless, apathetic, and still complained of severe pain over the supra-orbital region on the right side, and did not seem to respond to anything that we did for her. The discharge from the wound was thick and tenacious. On the morning of the 23rd of April, the temperature rose to 105.8° and in a few hours dropped to 102.6°, rising at six o'clock that evening to 106° with a slight chill. At that time a blood count was taken which showed 25,000 white blood cells with over 90 per cent of polynuclear cells. A blood culture taken proved negative. A lumbar puncture found the fluid under quite some pressure, and cloudy. The fluid was taken over to our laboratory immediately, for examination and culture. Examination showed 2,200 leucocytes to the cubic millimeter, which indicated a very severe infection. A consultation was held that night with the family physician Dr. Waller, and Dr. Libman. Examination showed every evidence of meningitis. The child's head was considerably retracted. She was in a state of opisthotonos, the reflexes were slightly exaggerated, Koenig's sign was present. We decided

that the case was practically hopeless, and that within a few days the child would die. Up to that time we had not received the report of the culture of the spinal fluid.

As soon as this decision was given to the family, they immediately decided to take up Christian Science, and a practitioner was called in. I expected to see the child in extremis the next morning. So you can imagine my surprise when I went to the hospital the following day, to find her half-sitting up in bed, playing with her doll. The temperature had dropped to 104°, and from then on the temperature gradually went down and every symptom of meningitis disappeared. The report on the culture showed that it was sterile. The wound gradually healed by secondary intention, until practically no evidence of any trouble was present.

I neglected to say that, at the time of the second operation, in investigating the condition of the antrum and the attic, the malleus and the incus were removed, so I had very little idea that any hearing would return in that ear. I have watched the child carefully since the time of operation, and have been agreeably surprised to see how she has improved, both mentally and physically. At the time of her ear disease, she was extremely irritable, and impossible to manage, while today she has returned to a normal state of mental equilibrium. At that time her physical condition was so poor that she was nothing but skin and bones, while today she has developed so well that she is normal in every particular. I have examined her within the last few weeks, and find that both ears are absolutely dry, both mastoid wounds are healed properly, and much to my surprise, her hearing in her right ear, in which the ossicles were removed, is just as good as in the left.

There are a number of important points to deduce from a case like this one. *One.* That there are certain types of acute mastoiditis, particularly due to an infection from the streptococcus hemolyticus, in which we get invasion of the bone, beyond the mastoid cavity. *Two.* That such cases frequently necessitate a secondary operation. *Three.* That symptoms of meningitis may be present, which may clear up, when the culture of the spinal fluid remains sterile. My own opinion is that there must have been a localized, epidural abscess which had eventually ruptured into the mastoid wound, clearing up the trouble. It is almost impossible to definitely conjecture how a case like this one can get well, but there is no doubt that, in this instance, the child had some localized infection which fortunately cleared up. *Four.* One must be extremely cautious in his prognosis, even when the severest symptoms are



present. I have no doubt that if the consultants had waited until the next day, when a report of the culture of the spinal fluid had come in, they would never have given the prognosis they did. It is just in instances like this that Christian Scientists step in, and are credited with the cure. Fortunately the parents are sensible enough people to realize that a co-operative interest such as was given this child, perhaps had a great deal to do with saving her life, but there is no reason that they should not think that Christian Science had something to do with the miracle. *Five.* It is of peculiar interest that this child's hearing should be as good as it is in the re-operated ear, when one considers that the ossicles had been removed. We have always been of the opinion that under such circumstances, the ear practically is dead, but there are instances, apparently, where the hearing returns, even after the ossicles have been taken out.

2178 Broadway.

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#### THE PRINCIPLES INVOLVED IN THE X-RAY TREATMENT OF TONSILS.\*

DR. W. D. WITHERBEE, New York.

The tonsil histologically is made up chiefly of lymphoid tissue and a connective tissue framework. Pathologically, the cells of the lymph follicles are stimulated to excessive cell proliferation, causing distortion of the crypts and retention of their contents.

The proliferation of cells of the lymphoid tonsil shows a much larger increase in the lymphocytes than in the germinal center of the follicles. The fibroid tonsil, on the other hand, shows an increase in the germinal center of the follicles. The germinal center of the follicles is characterized by the different forms of lymphoid cells all the way from the embryonic type to the mature cell at its periphery. Therefore, one finds numerous cells in this area in various stages of mitosis. These pathological cells which are found in the follicles of the diseased tonsil are as susceptible to the effects of X-ray as any of the embryonic cells in the body.

The filtered dose of X-ray used in this treatment is only about one-fourth to one-third the dose used in the treatment of ringworm of the scalp in children, hence overcoming the objections of a possible injury to any of the adjacent normal cell structures. The frac-

\*Abstract of paper read at Laryngological Section, New York Academy of Medicine, December 22, 1920.

tional method of dosage given at two weeks' intervals allows the normal cells to completely recover while the pathological cells, being more sensitive, are unable wholly to re-establish themselves. Thus, by a series of such treatments, the pathological cells will finally be overcome and absorbed.

The decrease in size and smoothing out of the tonsil surface is due to the X-ray effects on the lymph follicles as heretofore described. This shrinkage produces an eversion of the crypt, lessens its depth, and relieves the distortion and retention. The fibroid tonsil, the type commonly found in adults, is more amenable to the X-ray on account of the susceptibility of the immature cells in the enlarged germinal center. The infected fibroid tonsil is small in size and on pressure a thin, milky discharge exudes, usually containing large numbers of streptococci.

The direct effect of X-ray on bacteria when applied to a growing culture is practically nil. In the series of thirty-six cases treated at the Rockefeller Institute, thirty-two were negative to pathogenic bacteria four weeks after treatment, and no change was noticed in the number of colonies of the ordinary bacteria usually found on the mucous surface.

Whether the above results on pathogenic bacteria are due to the evacuation and drainage of the crypts or to an increased local phagocytosis we are, at present, unable to discover. These results seem to coincide with those obtained in acne vulgaris. In this condition we have a chronically infected sebaceous duct and gland corresponding to the infected crypt and follicle in the tonsil. Acne vulgaris presents one of the most striking and permanent results in X-ray therapy.

We are all aware of the fact that after tonsillectomy in subjects above the sixth and eighth year of life there still remains a considerable and maybe a vast amount of diseased lymphatic tissue containing pathogenic bacteria. It would seem reasonable to suppose that the effect on this tissue would be the same as that produced on the tonsil, and thus relieve foci of infection not reached by tonsillectomy.

X-Ray treatment will be especially indicated in those cases associated with chronic endocarditis, pericarditis, hemophilia, or any co-existing conditions which contra-indicate an operation or anesthetic.

For X-ray technique and results see the January issue of the *American Journal of Roentgenology*, and *A. M. A. Journal* of January 22, 1921, and *New York State Medical Journal*, January issue.

116 East Fifty-third St.

## CHRONIC MASTOIDITIS WITH AN EXTENSIVE CHOLESTEATOMA.\*

DR. HERMAN F. LAMPE, New York.

*History.* A man, aged 60, born in Poland, whose family history is negative, who denied venereal infection and who showed no hereditary predisposition to tuberculosis or any other chronic infectious disease, had an abscess behind the right ear twenty-four years ago. This was opened and drained, and complete healing took place in a few days. There was no discharge from the canal at this time nor at any other time as well as the patient can remember. The hearing always seemed to be normal, and there was no history of headaches, vomiting or vertigo during the lapse of twenty-four years. The patient stated that he occasionally noticed a little tenderness at different times behind the right mastoid when he happened to touch it. There were never any digestive disturbances and the appetite was always good. In other words, the patient's general health was always the best.

The present illness began the last week in March, 1920. The patient stated that he had a very slight cold in the head at this time, and this was followed by sharp pains in the right ear and over the right parietal region. He went to his barber and had this area massaged daily, but obtained no relief. On April 9, 1920, he came to the clinic of the New York Eye and Ear Infirmary complaining of intense pain over the right side of his head. He also stated that he had noticed a little moisture within the canal on several preceding mornings.

*Physical Examination.* The patient was 5 feet 8 inches in height and weighed 200 pounds. He appeared to be very ill and seemed to be suffering a great deal of pain. The pulse and respirations were normal, and the temperature was 100.2°. The pupils were equal, reacted well to light and accommodation, and the eye grounds and muscle movements were normal. There was no nystagmus. There was a slight nasal catarrh present; otherwise the nose and throat were negative. The left ear was normal and the hearing perfect. The right ear showed a slight scar behind the auricle where the Wildes incision had been done twenty-four years before. There was no swelling whatsoever, but there was marked tenderness on pressure behind the mastoid tip. The tympanic membrane was intact, and there were no perforations or scars to indicate that it had ever been ruptured. There was no bulging present, but

\*Read before the Section on Otology, New York Academy of Medicine, October 8, 1920.

there was a slight tinge of redness along the long handle of the malleus. The external auditory canal was normal in length and caliber, and there was no drooping of the postero-superior canal wall. There was, however, a fistulous opening leading through the posterior canal wall into the mastoid cavity, through which a probe could easily be passed. There was a slight amount of moisture about this opening, but no distinct discharge. The hearing was only slightly impaired, as a low whisper could be heard five feet away. The high tone limit was normal, the low tone limit slightly raised. Weber referred rather indefinitely to the right and Rinne was positive. A physical examination showed the heart, lungs and abdomen normal. All reflexes were normal. There was no Babinski reflex and Rombergs sign was negative. The urine examination was negative.

*Treatment and Course.* The patient was advised to enter the hospital at once, but due to certain business affairs was unable to do so. However, the tympanic membrane was incised in the clinic under nitrous oxide anaesthesia, but no fluid was found in the middle ear. An X-ray was taken at this time. The following day the patient returned to the hospital with all symptoms unrelieved. The incision in the tympanic membrane was healed. This time he consented to remain in the hospital. The skiagraph showed the left mastoid to be of the sclerotic type, with a forward sinus and a few cloudy cells in the petrous base. The plate of the right side showed a few cloudy cells above the external auditory canal. The entire mastoid portion of the bone was occupied by a circular area 46 mm. in diameter, indicating loss of bone. It was limited in front by the anterior border of the sinus. Within the upper part of this area was another, indicating still further destruction, probably involving the sinus and dura. (See cut.) A lumbar puncture showed the cerebrospinal fluid to be negative and under no pressure. A blood culture was also negative. A smear taken from the fistulous opening in the posterior canal wall showed a few short chains of streptococci.

On April 12, 1920, the mastoid was opened under general anaesthesia, and the usual radical operation performed. There was a medium sized perforation behind the mastoid tip in the region of the emissary vein. No pus was encountered here, but a large mass of grayish white material was seen lying beneath the cortex. The cortex was then gently removed from this area with the rongeur forceps. No mastoid cells were encountered at all, and the cavity to which there seemed to be no ending was filled with this cholesteatomatous material. The skin incision had to be extended

posteriorly by the Whiting method due to the extensive involvement. The cholesteatoma was formed in layers and was firm and compact. No pus was encountered until the antrum was reached and here only a few drops. The antrum was deep and seemed to be walled off from the middle ear as the smallest probe could not be passed through. The posterior canal wall was necrosed about the perforation, but the bone over the facial ridge and the labyrinthine wall was dense and did not seem to be included in the destructive process. The ossicles were present and appeared to be well preserved. There was no cholesteatoma found in the middle ear. After all the cholesteatoma was removed, it could be seen that the entire inner plate was gone due to the great destruction, and the middle fossa, lateral sinus and cerebellum were all exposed. The sinus was covered with granulations. These, however, were not disturbed. The dura was of a dirty gray color and did not appear at all healthy. The cavity made by the removal of the cholesteatoma was of an enormous size, extending almost 50 mm. behind the external auditory canal. The usual skin flap was taken from the posterior canal and sutured in place and the cavity packed with iodoform gauze. The wound was left wide open, and the sterile outside dressing applied.

On the second day following the operation, the temperature rose to 102.4°. The packing was removed on the third day and replaced with sterile plain gauze. The headache was greatly relieved, but it persisted slightly for some weeks. Seven days after the operation the temperature was normal, and has remained so ever since. The patient remained in the hospital for one month, during which time daily dressings were done. Since then, he has been dressed three times a week in the clinic. The posterior wound has been permitted to remain open, and in all probability will not be closed, as it permits a good view of the entire cavity, and in case it should ever become reinfected or more cholesteatoma form, the proper treatment could be instituted through the opening.

The Eustachian tube has never closed, although it has been curetted several times. However, there has never been any discharge coming from it. The cavity is now completely dermatized except for one small area beneath the tegmen antri. This will in all probability heal within a short while. Since leaving the hospital, the patient has attended to his vocation and has been feeling perfectly well. However, there is still a little tinnitus aureum present. This was rather marked shortly after the operation, but has greatly diminished since.

*Summary.* The most interesting question to be decided in this case is whether or not the infection was primarily seated in the middle ear. Was the condition of twenty-four years ago an acute purulent otitis media with a subperiosteal abscess? It is impossible to determine whether or not the tympanic membrane was ever ruptured or whether or not there was ever a purulent inflammation of the middle ear, as the patient denied ever having a discharge from the canal except the slight amount of moisture he noticed a few mornings before coming to the infirmary, and that certainly came from the fistulous opening in the posterior canal wall. It seems quite likely that the primary condition began within the bony canal wall, probably from an otitis externa. The developing of such an enormous cholesteatoma must have taken quite a while, and in



all probability the beginning dates back to the post-auricular abscess twenty-four years ago, and the patient stated that there was tenderness over this area on pressure at different times during the twenty-four years. The acute rhinitis that preceded the last attack may have been coincidental, but it is more likely that the congestion traveling up the eustachian tube to the middle ear, aggravated the condition in the mastoid and caused the unpleasant symptoms. It seems more or less unusual for the patient to recover without developing some intracranial complication, as the dura and sinus both seemed to be involved at the time of the operation. However, it's not safe to say that all danger has yet passed.

55 West 55th Street.



## CHRONIC PURULENT OTITIS MEDIA.\*

DR. ALFRED A. SCHWARTZ, New York City.

The study of chronic purulent otitis media in the clinic is difficult, for there is no possible way of keeping the majority of the patients interested in their own condition for any length of time. As a rule ignorant, they are of the type that travels from one clinic to another, discouraged if no marked benefit occurs in a short space of time. Then, too, if the symptoms are in any way ameliorated and they are able to return to their work or household duties with only slight inconvenience, they disappear from view; nor is it possible to convince the greater number that the condition from which they suffer is one which is serious and which should be watched with the utmost care. Feeling that they have borne the disease for months or years with perhaps but little discomfort, they are content to allow the process to continue unchecked until such times as the discharge becomes too profuse for comfort or symptoms referable to complications become manifest.

In the series of cases here reported the diagnosis of chronic purulent otitis media was made partly from the history and partly from the otoscopic picture which presented itself. It was often difficult to obtain a coherent history from the patients, and in these the appearance of the drums, the character and location of the perforation and the condition of the middle ear determined the diagnosis.

It is difficult to decide on any time limit after the onset of an acute otitis to call the resultant purulent condition chronic. Otologists, disregarding the pathological findings early in an otitis, have as a rule declared that six to eight weeks should mark the limit of the acute attack, and it is then considered that the otitis passes into the subacute or chronic stage. Therefore, all otitides which had been discharging eight weeks or were of longer duration have been included in this study; also those cases where there had been an intermittent discharge for any length of time, even though they came under observation at such a period when there was an acute exacerbation of the chronic otitis. Finally, there has been included a type which clinically is an acute otitis, but which has been pointed out by Kopetzky to be chronic from its incipency—or at least present those elements of pathological changes in the middle ear which tend to a chronicity, as evidenced by a marginal perforation of the

\*From the Oto-Laryngological Department, Beth Israel Hospital, New York. Service of Dr. S. J. Kopetzky.

membrana tympani and signs of necrosis of the ossicles or in the bone contiguous to the perforation.

*Etiology.* There were ninety-four cases of chronic purulent otitis media treated in the clinic between August, 1919, and August, 1920, of which forty-eight were males and forty-one females; in five the sex was not recorded on the files. In thirty-two cases the right ear alone was affected, the left in twenty-seven, and in thirty-five there was a double purulent otitis.

Where one ear alone was involved, the patients suffered little as far as the hearing was concerned; but where both were affected and had been neglected, the results were pitiable in many instances. Some of the patients had been compelled to give up fairly lucrative positions because of the progressive deafness and the frequency of other symptoms, and many were unable to do more than the most menial sort of work. Neglect in early life was mainly responsible for the condition which developed and serves as a warning that there must be a campaign of education in this branch of medicine among the laity.

*Age.* Ten patients of the group were under 1 year of age, and of these there were three who were less than 6 months; thirty-five were between 1 and 5 years and twenty-six between 5 and 15. Thus it will be seen that seventy-one out of ninety-four cases, or 75 per cent, were under 15 years of age. The oldest patient was 62, and the remaining twenty-two cases ranged between these ages.

Practically without exception, these patients lived in unsanitary surroundings, in the tenements of the lower East Side. Their knowledge of the care of the ear, nose and throat was negligible, and in the majority of instances where any history was obtainable the acute otitis had ruptured spontaneously and had been neglected and untreated for varying lengths of time. In a few instances the adenoids and tonsils had been removed before the onset of the otitis, but these were few indeed, and a large number, both adults and children, presented upon examination badly diseased tonsils and many older patients showed evidence of disease in the accessory nasal sinuses or obstruction in the nares.

An attempt was made to determine the etiology of the otitis, but was given up as hopeless. Not only was it impossible to ascertain the disease existing at the onset of the ear suppuration, but even the time of duration of the discharge was uncertain in most instances.

*Bacteriology.* In a small group cultures were made from the purulent discharge and were without exception found to be mixed

infections. In all, the predominating organisms were staphylococci and the colon group; then streptococci and occasionally other organisms. The bacilli of the colon group were frequently present whether there was an odor apparent or not.

*Otoscopic Picture and Its Relation to Pathology.* The otoscopic picture in chronic purulent otitis media presents factors of importance for the prognosis and treatment. When there is a central perforation of the membrana tympani, not involving Shrapnell's membrane and not reaching the attachment to the annulus tympanicus, it is generally conceded that there is no necrosis of bone in the mastoid process or the bony walls of the middle ear; and that any necrosis, if present, is limited to the ossicular chain. With this exception, the disease is limited to the mucosa, and the process is considered as non-dangerous in contrast to perforations of the marginal type.

With the marginal perforations of the drum membrane there is a co-existing bone necrosis at the side of the defect, and often this bony change extends well into the surrounding parts. When such a perforation is located in the postero-superior portion of the drum it is probable that the aditus and mastoid antrum are involved; when the perforation is located in Shrapnell's membrane, the tegmen may be diseased. In short, marginal perforations are of the dangerous type and may at any time, through extension of the bone necrosis, lead to complications which menace life.

Unfortunately, the pathology of the middle ear and the neighboring bony parts cannot be correctly deduced from the otoscopic picture. While a marginal perforation has been proved to be accompanied by bone necrosis in so large a majority of cases as to make the exception rare, the extent of the osseous lesion can in no way be determined by examination. Small perforations have in many instances been found associated with a necrosis of a great part of the mastoid or a cholesteatoma which had eaten its way far toward the inner table; while on the other hand, perforations which in instances have involved the entire drum have been found associated with the usual sclerosis of the mastoid which is found in long standing cases and only a small amount of destruction of the annulus tympanicus.

Of course, in the central perforations there is no necrosis of the cellular structure of the mastoid or the walls of tympanum, and very often through the perforation destruction of the ossicles or part of the ossicles can be determined; but by otoscopic examination the extent of the disease of the mucosa cannot be gauged, nor its

extension into the attic or into the mastoid antrum through the aditus, nor the condition of the mucosa of the Eustachian tube.

Thus it is seen that the size of the perforation and its location, or even the whole of the otoscopic picture, are of but little aid in determining the extent of the lesion. The diagnosis of cholesteatoma may be made from the otoscopic picture, aided by an examination of the purulent discharge; but the amount of bony destruction and the nearness of approach of the tumor mass to vital structures cannot be gauged. For the marginal type of perforation tends to the formation of cholesteatomatous masses in the mastoid and antrum and these may grow to an enormous size, causing bone absorption gradually without change in the otoscopic picture and with a minimum of symptoms.

*Pathology and Its Relation to the X-ray Findings.\** For a long period the X-ray has been used as an aid to diagnosis in both acute and chronic diseases of the mastoid process; and it has been possible in many cases to clear an uncertain diagnosis and to confirm others.

To determine whether it is possible to discover from the X-ray findings which type of chronic middle ear suppuration is dangerous or non-dangerous, a series of roentgen examinations were made.

It has been taught that with marginal perforations there is disease of the surrounding bony framework and this has been definitely proved by both operative findings and autopsy. A large number of chronic suppurating otitides with marginal perforations were X-rayed, the ages of the patients ranging between 7 and 40 years, and the Roentgen picture was in every instance similar. There was a complete absence of cellular structure of the mastoid process, regardless of whether the disease had been present for months or years, and the X-ray diagnosis in each case was "sclerosis of the mastoid." In some the antrum appeared cloudy; in others the outline was sharp and clear; and in all the outline of the sinus was more distinct than is normal.

The non-marginal perforations showed quite a similar Roentgen picture. In only two cases was there evidence of a few cells about the antrum, and in these the outline was hazy. One other showed the cells distinct and clear, although the septal markings were apparently greatly thickened. The remainder presented a picture almost identical with those presented by the marginal perforations—absence of mastoid cells, apparently a sclerosis of the bone and sharper definition of the sinus outline. It is obvious that suppuration in the

\*X-ray examinations made by Dr. Charles Gottlieb, of the hospital laboratory, and Miss Greenfield, technician.

tympanum has access to the mastoid antrum and cells through the aditus, and there is in all cases of middle ear suppuration an extension of the process to the mucosa of the adjacent parts—aditus, antrum and undoubtedly the mastoid cells. This has been shown by X-ray pictures in acute suppurative otitis media, where apparently the mastoid is not involved, and which cases do not require further surgery after proper drainage of the middle ear has been established.

Because of the continued suppuration there is a chronic periotitis of the bony walls of the mastoid antrum and cells, and then a chronic otitis, and these bony changes, together with the swollen condition of the mucosa and the granulations which form in chronic suppurative conditions, cause an appearance of obliteration of the mastoid cells. These changes are the same in both marginal and non-marginal types, the marginal types being accompanied, however, by a true infection of the bone—but which is not apparent upon the X-ray plate—and the otitis is far more marked and the actual bony change of more rapid advance than in the non-dangerous form.

Two cases of healed central perforations were X-rayed. In both of these, there was no history of discharge from the ear obtainable, the patients applying for relief of progressive loss of hearing and tinnitus. X-ray on both of these cases showed complete absence of mastoid cells of the affected side, the other side being normal. Whether there had been an acute attack or whether there had been an otitis of long standing in childhood, cannot be said, and positive conclusions cannot be drawn from the report of two such cases. Yet it is of interest to surmise what would have happened had an acute otitis developed, with perhaps some mastoid tenderness, and an X-ray been taken. Might not the "cloudiness" of the picture and the absence of the cell outline and mastoid symptoms have been sufficient to tempt one to immediately explore the mastoid?

It is important in reading the Roentgen picture of mastoids to bear in mind the work of Cheatle, who has called attention to the variations in normal mastoids which, of course, must cause marked variations in the normal X-ray findings. There are also frequently differences in both mastoids which must be borne in mind, and a markedly cellular mastoid in one side may be accompanied by a normal mastoid containing only a few cells on the other. These marked variations in the same person are, however, rare.

In all the cases X-rayed in this series the changes were so marked that the abnormality was obvious, and in all those where only one

ear was suppurating, the comparison of the X-ray plates of both mastoids, which must be made in every case, was distinctive.

It is to be noted, then, that the Roentgen examination was of no importance in determining the character of the suppuration, whether bone necrosis was present or not, or the extent of the lesion; nor could the density of the bone be gauged. All that could be of value was the determination of the location of the sinus and frequently other landmarks of importance in the radical operation. Occasionally, it is true, the outline of a cavity such as is caused by a cholesteatoma may be seen, or necrosis of the sinus wall or inner table when there is abscess formation and these have been eaten away; but such conditions and such plates are rare: and unless these be found, diagnosis, cause for operation or prognosis cannot be drawn from the Roentgen findings.

*Symptoms and the Pathology.* An understanding of the pathology of chronic middle ear suppuration is necessary for a comprehension of the symptoms.

*Hearing.* At times the amount of hearing that remains with almost a complete absence of the drum membrane and destruction of the ossicles is remarkable; and too often is there marked diminution of hearing when only a small perforation is present. To a large extent this is due to the character of the mucosa about the oval window. If the discharge has room enough, early in the disease, to make its escape without too greatly damaging the mucosa in this region, the hearing will probably be better. Protective adhesions between the footplate of the stapes and the oval window rapidly form and to this must be laid a great part of the loss of hearing. The stapedius muscle loses its tone and the ligaments of incus and stapes are involved and become greatly thickened.

In many cases there is an intermittent discharge and the patient claims to hear better and feel more comfortable when there is a discharge than when the ear is dry. This is especially the case when there is a perforation in the postero-superior portion of the drum or in Shrapnell's membrane, and is due to the blocking of the discharge either in the aditus or in the folds of the attic, and the resultant pressure.

*Pain.* As long as there is sufficient drainage from the middle ear, the pain is usually negligible. When, however, the damming back of pus in the mastoid or attic occurs, the pain ensuing becomes severe and is not relieved until proper drainage has been re-established.



In cholesteatoma, there may be pain caused by the growing tumor, but severe pain may be caused by irrigation, water causing a swelling of the cholesteatomatous masses; and the pressure of the growth, suddenly enlarged, upon the unyielding bony walls, causes excruciating pain.

*Tinnitus.* The cause of the tinnitus is as yet unexplained. The distressing tinnitus may be due to pressure upon the labyrinth, caused by the adhesions and changes in the relations of the foot-plate of the stapes to the oval window, or the periostitis of the labyrinthine wall which forms part of the middle ear.

Finally, other symptoms, such as vertigo, nausea, nystagmus, facial paralysis, are due to complications,—destruction of the bony framework covering the labyrinth and facial canal or extension of the suppurative process through dehiscences.

*Conclusions.* 1. Neglect of chronic otitis media brings in its train serious results in later life, as regards both the patient's comfort and life. These complications, which so often threaten, are little understood by the laity and demand a campaign of education.

2. The extent of the pathologic lesion cannot be determined by the otoscopic picture. The size and location of the perforation and the character of the discharge cannot be relied upon to give conclusive evidence as to the amount of destruction to the parts surrounding the middle ear, or to the nearness of approach to vital structures.

3. The X-ray is of undoubted value in cases of chronic purulent otitis media where there is erosion of the sinus wall and tegmen, with abscess formation, and in some cases of cholesteatoma. If operative interference is decided upon, the X-ray should be used in every instance to determine the location of the sinus. But the type of disease, whether dangerous or non-dangerous, and the extent of the lesion, cannot be gauged by Roentgen examination.

51 West 73rd Street.

PRIMARY MASTOIDITIS WITH PERISINUS AND  
EXTRADURAL ABSCESS.—OPERATION.  
—RECOVERY.

DR. OTTO GLOGAU, New York.

A perusal of the textbooks and literature shows that most otologists are somewhat doubtful as to the clinical entity of primary or idiopathic mastoiditis. This scepticism, however, lacks, according to Dabney, in that medical imagination, without which some of the best creative work in pathology and preventive medicine would have remained undone. On the other hand, quite a number of cases of primary mastoiditis have been reported, where symptoms referring to a previous or simultaneous involvement of the middle ear have been overlooked or omitted. It has been frequently demonstrated in necropsies by Zaufal and Zuckerkandl that the mastoid cells can undergo necrotic and inflammatory changes, without the middle ear being involved. The route of the infection, in most instances, goes through the middle ear; only in rare cases through the blood. In primary mastoiditis the infectious material passes through the middle ear, without affecting the latter, as it apparently does not find favorable conditions for its growth. The aditus is poorly supplied with blood and practically represents a closed cavity. Once the infectious material has reached the antrum, due to inflammatory swelling, it walls off the mastoid cavity from the middle ear. Under these favorable conditions the bacteria proliferate and the bone tissue breaks down. According to Dench, primary mastoiditis may follow exposure to cold or traumatism or may be a manifestation of a tubercular or specific diathesis. Inflammation within the auditory canal, especially diffuse external otitis, may by contiguity lead to primary mastoiditis. Bacon mentions also influenza as an etiologic factor and draws attention to the possibility of spontaneous development of the disease.

The symptoms of primary mastoiditis may be divided into negative and positive ones. The negative symptoms are those characteristic of middle ear affection, such as shooting pain, tinnitus, autophony, impaired hearing, etc. *They must be totally absent in order to enable us to speak of primary mastoiditis.* Amongst the positive symptoms, pain is the most important. It is slight at first, but gradually becomes very severe and throbbing. There is usu-

\*Read before the Section on Otology, New York Academy of Medicine, January 9, 1920.

ally quite a marked tenderness on pressure. Sooner or later swelling and fluctuation over the mastoid area appears and the ear stands out. The inflammation, according to Bacon, reaches its height in between eight to ten days and may subside without suppuration, or an abscess may form and perforate the outer cortex after several weeks. There is always the danger of involvement of the sigmoid sinus and the dura. Hearing is usually unaffected. The prognosis is favorable, the wound heals usually very quickly. The differential diagnosis must exclude furunculosis of the external canal and supuration of a gland in the mastoid region. The absence of fever, sepsis and malaise is characteristic. The Roentgen picture may be of great aid in the diagnosis.

The following case of primary mastoiditis is characterized by the total lack of middle ear symptoms, the enormous amount of bone destruction, the encroachment upon the sinus and dura and the speedy recovery.

Mr. E. H., single, aged 43, cigarmaker, was referred to me by Dr. A. Fishman on October 6, 1919.

*Past History.* Patient had, quite some time ago, slight urethral discharge, no lues, no tuberculosis. He never had sore throat or ear trouble, he only occasionally had slight colds.

*Present History.* About four months ago, a few days after bathing, patient felt severe pain behind the ear. The drum membrane was incised at a dispensary, but no discharge appeared. As the pain continued, he went to a specialist, who, according to the patient's statement, removed a polyp from his nose. For the following weeks, the pain grew worse and kept the patient awake during night. About four days previous to his visit to my office, he noticed a swelling behind the left ear, and the ear was standing off. The swelling increased in size, and the pain became more excruciating. During the entire time, he had no fever, no constitutional symptoms of malaise.

Local inspection revealed a perfectly normal drum. No swelling in the canal, no sagging of its wall was noticeable. There was a large fluctuating swelling over the mastoid bone, which was very painful to touch. Hearing on the left side was normal, as evidenced by tuning fork and voice tests.

The next day, October 7, 1919, I performed the mastoid operation at Beth David Hospital. The regular incision showed pus oozing from a perforation of the cortex. The entire mastoid bone proved to be destroyed, the sigmoid sinus exposed to the length of 1 inch and surrounded by pus and granulation tissue. The destructive

process encroached also upon the dura, from where pus was oozing. It was exposed to the size of a dime and found to be apparently healthy. The antrum was entirely walled up from the middle ear and necrotic. It was enlarged and curetted, but no communication with the middle ear established. The cavity, after thorough cleansing, was packed and partially closed. The patient was out of bed the next day. He felt exceedingly well. The wound was dressed every second day and healed entirely after three weeks.

*Blood Count.* W. B. C., 13,800; differential count: polys, 71 per cent; lymphocytes, 26 per cent; trans., 1 per cent; eosinoph., 2 per cent.

In conclusion I wish to say, that primary mastoiditis is a distinct clinical entity which, as soon as diagnosed, should be operated upon. Recovery, even with encroachment of the destructive process upon sinus or dura, is usually speedy.

64 E 91st Street.

#### REPORT OF A CASE OF DISLOCATION OF THE EPIGLOTTIS.

FREDERICK T. HILL, Waterville, Maine.

Traumatic dislocation of the epiglottis is a condition not at all frequently encountered and for that reason the following case may be of interest. With the throat and neck a favorite point of attack in the usual rough and tumble fight it would seem rather a wonder that more injuries to the larynx are not noted. In this case the history was somewhat unusual and neither the patient nor his physician suspected the role played by the previous trauma in his subsequent trouble. It also demonstrates how little inconvenience results from the removal of a considerable portion of the epiglottis.

T. J. B., aged 27, a mulatto. Referred to me August 2, 1917, by Dr. T. J. Hardy. He complained of difficulty in breathing and had been referred to Dr. Hardy for examination of his lungs. Dr. Hardy reported his lung condition as negative and, suspecting a naso-pharyngeal cause, sent him to me. The patient was very hoarse and said he had been so for two years.

Family and past histories were negative. His chief complaint—difficulty in breathing—dated back two years, the same as the hoarseness. He had no pain of any kind. There was no difficulty in swallowing. Occasional cough but no expectoration. No loss of weight. Occasional sore throat. At first patient did not recall

any event two years before to which he could attribute his trouble, but, after examination of his larynx had revealed the condition of his epiglottis, close questioning brought out the fact that two years before he had been violently choked and strangled, so that he bled rather profusely from his throat and had lost consciousness.

*Examination.* The nose showed quite a marked deviation of the septum to the left. The throat showed large diseased tonsils. No adenoid. The laryngeal mirror showed a most peculiar picture. The epiglottis was thrown backwards, so that its long axis was horizontal and its tip touching the posterior pharyngeal wall. It was impossible to see the larynx itself with the mirror. By means of the Jackson anterior commissure laryngoscope a good view of the larynx was obtained. This was negative except for some thickening and slight redness of the vocal cords. Motion was normal. Apparently the difficulty in breathing was purely mechanical and resulted from the dislocated epiglottis obstructing the glottis.

Under cocain anesthesia the tip of the epiglottis was removed and an incision made horizontally in the median line, splitting it to its base. This resulted in an scalloped or notched epiglottis with the subsequent contraction from the longitudinal scar pulling the lateral borders upwards to a moderate degree. He had an uneventful convalescence and was relieved from his difficulty in breathing.

He was not seen again until May, 1920, when he reported for examination. The functional result was good. He had no difficulty in breathing and his hoarseness was improved although his voice was still husky. Examination showed a notched epiglottis still in the horizontal plane but shortened so that it reached only about one-half the distance to the posterior pharyngeal wall. There was no trouble in swallowing food. The vocal cords were still thickened and had some slight bowing in the center. There was a small node at the junction of the middle and posterior thirds on the left which was not seen three years before. He was advised to have his tonsils removed in an effort to improve this laryngeal condition, but has so far failed to do so, claiming he is satisfied.

This case emphasizes the necessity for thorough routine examination in all patients. Had not the larynx been examined one might have been tempted to attribute the difficulty in breathing to the deviation of the septum, although, of course, in this case the hoarseness pointed directly to the larynx as the prime factor. However, it brings out that oft-repeated and too often neglected teaching—to always examine the larynx as a routine procedure.

111 Main St.

## NEW YORK ACADEMY OF MEDICINE.

SECTION ON RHINOLOGY AND LARYNGOLOGY.

December 22, 1920.

### Sphenoidal Sinusitis With Marked Cerebral Symptoms. Operation. Recovery. Dr. L. Hubert.

The patient, aged 28 years, came to the Manhattan Eye, Ear and Throat Hospital about two years ago. Her troubles started in 1913, with a severe grippe infection. She complained of complete nasal obstruction, dullness and stupidity, and that she could not concentrate her mind on anything. She suffered from continuous colds with a large amount of nasal discharge of "fearful" nasty odor. Occasionally she would vomit in the morning. Headache was conspicuous by its absence. The most striking symptoms were attacks of stupor that would come on from time to time, when the patient would not talk, could not do the simplest calculations (whereas she used to be very good at arithmetic when in school), and could not do any physical or mental work.

Before coming to the Manhattan Hospital she had been treated by various physicians, who apparently did not recognize the cause of her trouble.

*Nasal Examination:* Anterior rhinoscopy, right nasal cavity: Mucous membrane of middle turbinate thickened, grayish, and muco-pus was present between the septum (which showed a high deviation) and the outer nasal wall. Left nasal cavity: no pus was present and there were no marked changes in the mucous membrane. Posterior rhinoscopy showed pus over the posterior tip of the right middle turbinate.

The Wassermann reaction was negative.

The X-ray examination of the right ethmoidal cells showed granulations or pus. There was no report on the sphenoid sinuses.

On November 19, 1918, Dr. Byrd performed a submucous resection, of the nasal septum. The patient could then breathe better, but her other symptoms remained as bad as before. On December 13, 1919, a complete exenteration of the anterior, middle, and ethmoidal cells of the right nasal cavity was done. The anterior wall of the sphenoid sinus was removed and pus of rotten odor was found in the sphenoid sinus. Both antra were washed out and no pus was found.

Two days after the operation the patient remarked that she had never felt better in her life; the stupid feeling was gone and she felt like doing some work. A few weeks after the operation she went to work as a dressmaker. It is now a little over one year since she was operated upon, and during the whole year she has had no attacks of colds, no nasal discharge, no bad odor, and no recurrence of the mental symptoms.

The diagnosis of sphenoidal sinusitis is based on the fact that pus was found in the sphenoid sinus during the operation and that the sphenoid sinus is the sinus par excellence that will cause such severe toxic symptoms.

The case may be considered as a cured sphenoidal sinusitis, because all the symptoms have disappeared and the patient does not require any



treatment. Nasal examination shows the sphenoid sinus widely open, no discharge present, and no crust formation. There is no subjective feeling of dryness within the nose or throat.

**Sphenoidal Sinusitis, With Marked Cerebral Symptoms. Operation. Recovery. Dr. E. Rose Faulkner.**

I first saw this patient on October 3, Sunday, in consultation with Dr. Carey at the Manhattan Eye, Ear and Throat Hospital. She had just arrived in an ambulance and was looking very ill and emaciated. She had been seen the day before by Dr. Wiggers, of Flushing, who had diagnosed a double optic neuritis and suggested having her nasal sinuses examined.

The following is a brief history of the case:

Last April she had an attack of influenza and made an apparent recovery. On May 4, she became ill with great prostration and temperature went up to 103°, with no special localizing symptoms for two days when she developed severe pain in the head, and the eye and back of the ear. She had slight retraction of the head and cerebro spinal meningitis was considered a diagnosis. She then became very drowsy, sleeping most of the time for a week except when aroused to take food.

The chart record starts May 8 and her temperature was then recorded 101.6° with pulse 86. The temperature arose daily in the afternoon to about this level, receding to normal each morning for two weeks, then returned to normal. During this time she complained of severe frontal headache, with occasional numbness in the left arm and vomited several times. She was being treated with high colon irrigation, and was also given some aspirin and codeine to relieve the headache. After a week of normal temperature, there was a return of all the symptoms. The temperature went up each afternoon to 101 to 102°, falling to normal in the morning. This continued through June and July, the maximum afternoon temperature being 103°, the pulse ranged from 80 to 116. Three weeks from the start of her illness the chart records that she expectorated a great deal during the day. She herself says that almost from the beginning she expectorated a considerable quantity of pus from her throat each morning and occasionally blew some out of her nose and that it had a bad taste and odor sometimes. Her record during June mentions the frequent severe headaches, also mentions pain in the left arm and shoulder at times, and perspiring freely. But as she received aspirin and salicylatis, the sweating may have been due to that.

During this period blood tests, blood counts and blood cultures were made, all with negative results, and high colon irrigations given almost daily throughout.

So the case dragged on through August and the first half of September, gradually losing ground with about the same symptoms. In the last week in September, however, a new symptom appeared. She began having a twitching in the muscles on the left side of the face and arm. This increased to a convulsion seizure of the left side of the body. The face turning toward the left shoulder at the onset. These continued daily or oftener till the time I saw her. October 3.

On admission she presented the appearance of a person very ill and complained of very severe headaches with temperature 100°, and pulse rate 98. A few hours after admission she had a convulsion, lasting four minutes, limited to the left side after which the pain subsided. A specimen of sputum was sent to the laboratory to be examined for T. B. There were none found. As the question of T. B. had been considered, I called in Dr. Jones Alexander Miller to examine her. He found no trace of any lesion in the lungs. On examining the nose and

throat, after shrinking up the passages with cocaine and adrenalin, there was very little positive evidence of diseased sinuses. The septum was deviated and interfered somewhat with the examination. X-ray examination showed some suspicion of the sphenoids and posterior ethmoids. Examining the nervous system, she had a double optic neuritis, diagnosed by Dr. Wiggers and confirmed by Dr. Miller. She had a loss of abdominal reflexes and a positive Babinsky on the left side. Our diagnosis was a probable brain abscess located in the right crus involving the motor tract or possibly meningeal irritation and the right crus, the irritation having spread from the posterior wall of a diseased sphenoid. With the possible hope that the latter might be the correct diagnosis, I determined to open the sphenoids. She was given a general anesthetic and the septum removed as quickly as possible. The complete exenteration of ethmoids was performed on both sides and the out sphenoid walls opened as much as possible. On entering the sphenoid, of course, one could see nothing but the inside on both sides was filled with polyps or granulations. She was put back to bed in a rather poor condition. In a day or two her condition began to improve. She had no convulsion after the operation and the headaches disappeared by the end of a week. The optic neuritis also cleared up very rapidly. There was considerable pus drained from the sphenoids. She was discharged from the hospital November 14, convalescing rapidly with a very marked gain in weight. The pulse rate was still over 100 on slight exercise and the temperature was a half a degree above normal in the afternoons. This slight temperature I thought would last for sometime after a pyretic period of over five months.

I saw her several times since then at my office and her convalescence was altogether satisfactory till last week, when she developed what seemed to be a cold in the head. She had a convulsion limited to the right side. The onset was marked by turning of the head to the right. She was examined by Dr. Wiggers and he found that she had an optic neuritis in both eyes with an hemianopsia. He located the lesion in the left optic tract, probably near the chiasm. I opened the left sphenoid which had become partially closed and found nothing on pushing backwards to the outside of the sphenoid opening. I entered a posterior ethmoid cell which extended back laterally as far as the sphenoid. This contained some granulation and pus and was drained considerably since.

She again seems to be on a fair way to recovery as there has been no convulsion, the temperature has come down and Dr. Wiggers reports her eye condition improving.

#### DISCUSSION.

DR. MACKENTY said that there is no question but that sphenoidal sinusitis, even in the milder types, will produce a certain amount of cerebral disturbance, stupidity, loss of memory, loss of the power of application, etc. Dr. Hubert's case was an exaggerated instance of this condition. Dr. Faulkner's case was not so marked, but the symptoms were quite characteristic of the disease, particularly of the posterior sinuses, loss of application and memory and the dulling of all the functions of the mind.

DR. COFFIN said these physic disturbances were apt to accompany the disease of any of the sinuses.

Only this morning a lady whose antrum he had opened and washed said to him: "Dr. Coffin, I know my sinus is better; but my greatest satisfaction is that I feel so much better in my head. For some months I have been unable to concentrate my mind on anything. I actually wondered if I was going insane." I congratulate Dr. Hubert on his operation and results.

**Epithelial Inlay in the Restoration of the Vestibule of the Mouth. Dr. H. S. Dunning.**

This patient was run over last summer by an automobile, and after a great deal of treatment for the restoration of her lower jaw she obtained a very good result, approximately as presented. The lower lip was badly lacerated and infected, and for some weeks pieces of bone and teeth were removed. Some six weeks later, Dr. Martin considered the question of releasing the lip, the mandible having been knocked out and the lip adhering to the periosteum covering the mandible. I thought of the epithelial inlay which they are using on the other side, and we operated together in St. Luke's Hospital, separating the lip with a periosteal elevator, making the opening of the mouth as large as we thought was needed; and when the lip was freed from the bone we slipped in a compo splint inside to fit the mandible, from the canine region, which was absolutely adherent; left the periosteum on the bone and freed the soft tissue. We then took a skin graft from the leg and wrapped this with the skin surface toward the impression, covering the edges and not having it overlap, and slipped this in between the periosteum of bone posteriorly, the bleeding surface of the soft tissues anteriorly. We depended on the sutures of the soft tissues and the rigid edges of the periosteum to hold it in place. In ten days we opened up this, and inside was our skin lining.

This splint is a great advance in oral surgery. It can be used in any part of the mouth, and is especially applicable where it is impossible to use artificial teeth. This lady now has a plate which fits in this sulcus. After it was epithelialized we put in gutta percha to prevent the skin graft from becoming cicatrized. She now wears a set of teeth with a great deal of comfort.

**Plastic Repair of the Angle of the Mouth. Dr. H. S. Dunning.**

The patient, a boy who suffered from a cancer some three years ago and lost the angle of the mouth, the tissues having become adherent to the vestibule of the mouth so that he could not open it more than a quarter of an inch. We tried the epithelial inlay on him but it all sloughed out, so we made a flap operation from the lower jaw. The problem was to form an angle for the mouth, and also to epithelize him and give him a lining. The flap was taken from the neck about the angle of the jaw, and thrown up, shaping it so as to give him an angle, but the skin surface sloughed and all we gained was the attachment of this flap to the angle of the mouth. We let that stay for a month and gradually cut it through. Finally it became very thick. We were up against it then, and did not know what to do, but we had to get a good thick skin lining. He had a defect the size of a half dollar after the skin was removed, so I took this skin and turned it inward, giving a skin lining to the mouth. We had it over, and turned it back on itself, undermining the edges and fitting in the edges of the flap so as to make a fairly good angle of the mouth. We then laced him up with the button to prevent contraction of the orbicularis oris muscle, etc. We finally got that around from bringing it over and back on itself with quite a scar tissue.

Three weeks ago a flap was taken to the vermillion border of the lip, and brought up into this position after excising the scar tissue, and we worked on this tissue so much that we lost part of the flap. The original operation was done last year; we gave him a rest for two months and brought him back into the hospital in the fall, and tried to make it better, but we lost part of the flap. He has a very good thick skin lining of the mouth—good and strong, and has pretty good use of his mouth—and has a practically working angle of the mouth.

**DISCUSSION.**

DR. FORBES thought that both cases were of extreme interest. Referring to the result of the first case as compared with the second, the same

flap being used, inquired in regard to the technique on the colored boy, whether the flap broke down and became septic immediately.

Dr. DUNNING, replying to Dr. Forbes, said that the epithelial inlay was inserted in the upper and lower jaw, and it seemed that the tissue was not so thick, and that the adhesions were thinner; they seemed to be plastered down, and he was unable to bury the tissue deep enough. The bed was not deep enough.

**Laryngectomy for Carcinoma of the Larynx. Dr. MacKenty.**

The patient I am presenting consulted me on January 21, 1920, having been referred to me by Dr. McTierman. For four years the patient had had winter hoarseness lasting for a month. In the spring of 1919, this hoarseness became permanent. Examinations for syphilis were negative. He was treated with radium in May, 1919, applied externally for eight hours and internally for two hours.

Examination in January, 1920, showed a mass on the left vocal cord, sessile, extending from the anterior commissure to within one-third cm. of the arytenoid. The left cord was fixed, and there was induration of the lateral left laryngeal wall.

Immediate operation was advised. The patient, however, elected to have radium applied again. On January 23, radium emanations were injected into the tissue, not in needles. The actual free emanations were injected.

The patient was next seen on March 1, 1920. Then he had an intense radium reaction, edema of the whole larynx, so that he had been able to take scarcely any food for four days; he had a temperature of 101°, was in great pain, and looked very ill. He was removed to the hospital on March 2nd, and a tube was inserted into the esophagus for feeding.

On March 5, a tracheotomy was done, and we then waited hoping that the reaction would subside, but the patient gradually lost ground and went down to 116 pounds. His temperature kept up practically all this time; he had a continuous septic temperature from then on to the last of April.

On April 30 a laryngectomy was performed. We were getting so desperate that we concluded that something must be done to get him out of his misery; I concluded then that he was suffering more from a septic infection due to necrosis of the larynx.

Immediately after the operation he began to improve, his temperature soon dropped to normal, and in a short time he began to pick up weight. As now seen he weighs 194 pounds.

The pathological report is interesting. Two different reports were obtained. In the first, they failed to find any actual cancer cells. The second report was made by another man, an expert pathologist, who found some evidence of cancer in a certain portion of the larynx, but the cells were not active. (Specimen exhibited.) Looking at this section, you will see a mass of hard looking tissue about the remnants of the cord. The larynx is split open from behind, and you will see the necrotic area which was the site of the abscess in the larynx which was killing the patient. He was dying of septic infection. The microscopic section shows a dense thick mass of connective tissue, with areas of lymphocytes, plasma cells, eosinophiles, and other wandering cells. These are situated chiefly around the blood vessels, etc. The section also shows a small part of the thyroid gland that was taken from the larynx because it could not be distinguished from the other tissue.

The second report was made by Dr. Leo Buerger, of Mt. Sinai Hospital, an expert microscopist, and he found cancer cells just beyond the necrotic tissue, grouped together but not undergoing active growth.

The conclusions drawn from this case are as follows: 1. Radium masks the clinical picture in cancer of the larynx. 2. Radium does not cure cancer of the larynx. 3. If we do operate, it should be done before the reaction sets in. The proper dosage is not yet determined. 5. The radium would have killed this patient, independently of the cancer, if the larynx had not been removed. He would have died of sepsis from the effects of the radium injected into the larynx.

In the winter, these patients suffer somewhat from breathing cold air in the larynx, and to obviate this I have them wear a small wire shield over the tracheal opening and a high-neck tight collar. As a result of this, they breathe the moist warm air which comes from the body, which supplements the warm air which would naturally come through the nasal cavity. (Shield exhibited.)

#### DISCUSSION.

DR. HARRIS said that of all the cases that had been presented the one shown by Dr. MacKenty was the most interesting on many accounts, not only the wonderful result obtained, but also what the case illustrated in regard to the use of radium. It is high time that the profession should observe such a warning as uttered by Dr. MacKenty. We are still very much in the dark as to radium, and in some cases are using it very indiscriminately and are getting more of such results as shown by Dr. MacKenty than some care to report. He had stated very definitely that had he not operated as he did the patient would have died not of carcinoma but of the abscess following the introduction of radium. This was a very grave warning in regard to the great care that should be exercised in the use of radium.

Dr. Harris then cited a somewhat similar case that had come under his own observation. The patient was a man of about 78 years of age, where operation was not considered necessary or desirable, where radium was used once with no particular benefit but with no ill effects; and then in the hands of another, a most skillful man, it was applied again more intensely and for a long time. The results were almost identical with those reported by Dr. MacKenty, a great reaction spreading throughout the larynx, temperature, dysphagia, marked pain, great loss of weight, etc., necessitating a tracheotomy. Fortunately, he made a recovery, although it was a slow one, which is quite in line with the fact that it was not a carcinoma that was killing him but the radium burn. It was a very close shave, however, and the man came very close down into the valley and was brought through only by very careful nursing.

DR. McTIERNAN said he had followed this case from an early stage and in his opinion radium was a valuable agent, but it could not be said that radium cured cancer of the larynx. He believed, however, that radium delays the process and that better results are invariably obtained if radium is used prior to a laryngectomy. He believes it is generally unnecessary to remove a section to make a diagnosis, besides the fact that such a procedure often sets up an infection or starts an ulceration. An injection of radium solution into the tissues of the larynx invariably results in an abscess, and if a laryngectomy is under consideration the procedure should be condemned. One cannot too strongly emphasize the importance of a correct diagnosis by exclusion, where cancer of the larynx is suspected.

DR. ISAAC LEVIN said he was not a laryngologist, but that there was one point in connection with the use of radium in the case reported by Dr. MacKenty in regard to which he would like to say a few words. The treatment of carcinoma of the larynx with radium presents many difficulties, and therefore whenever practicable the operative treatment should be undertaken first. One of the especial difficulties is the comparative ease of giving an overdose in the larynx and thus creating the condition



reported by Dr. MacKenty. The condition of the patient before operation was not due to radium treatment but to radium burn, caused by the peculiar method with which the radium was applied. Radium burn, whenever it takes place, is a severe clinical condition; it may at times produce a severe general reaction, is very painful, and requires a long time for healing.

The best method of treating a radium burn is that applied by Dr. MacKenty, a wide excision of the burn, removing as much of the normal tissue surrounding it as practicable. Dr. Levin said further that in his experience he had found that the longer one waits for the operation after radium exposure the better is the demarcation of the diseased tissue and the more successful the operation. If the operation is performed too soon, then the excision takes place within the affected tissue, the condition is made worse, and the necrosis becomes more progressive. He felt impelled to say this in connection with the statement made by Dr. MacKenty, that in another case with a severe radium burn it would be wise to operate as soon as possible. That course would be more dangerous than the one pursued in the case, of waiting with the operation.

Dr. MacKenty thanked Dr. Harris for upholding his statement in regard to the use of radium, and in stating it so much better. He also expressed appreciation of the information given by Dr. Levin in regard to the time for operation relative to the application of radium. It was more by good luck than by good judgment that he had waited two months before operating. The patient was in such bad condition that it was feared he could not go through with it. He had not advised operating when the radium burn took place, but before that. Dr. McTiernan was to be thanked for getting hold of this man in time and having him operated upon, and so saving his life.

**Idiopathic Septal Abscess.** Dr. Francis W. White.

The patient is 16 years old and gives a history of only one day's discharge from the nose, a watery discharge followed by swelling inside the nose so that she could hardly breathe. There was some pain and some tenderness, she came to the hospital for treatment.

She was treated by means of a nasal douche for a short time, and then interne made an incision into the septum on the right side; a great deal of pus was evacuated, the pain was relieved, but the tenderness persisted. After the escape of the pus, she noticed a little dimpling in the bridge of the nose about the cartilaginous portion, which continued to increase in depth as the intra-nasal condition cleared up. This was followed by furunculosis about the outside of the nose. The patient stated that she had never had anything of this character before, had not had her nose injured in anyway, and that she did not pick her nose.

As there seemed no reason for the formation of the septal abscesses, it was listed as idiopathic, which means "we don't know" what happened, but something did cause it without trauma of any kind. The Wassermann reaction was negative.

**Recurrent Laryngeal Paralysis.** ..(Second Presentation.) Dr. Francis W. White.

This patient was an oiler on a coastwise steamer, who came to the hospital a year ago, with the history that one day on coming from the engine room, he stepped on deck and took a glass of ice water, and had difficulty in swallowing. He thought nothing of it, but two days later he noticed that his voice "went bad," he had no voice, but just air coming from his larynx. Examination showed the left side to be absolutely paralyzed. The Wassermann reaction was ..... He was given salvarsan, and for a long time showed no improvement. He has now recovered his voice, not so much the result of a cure of the condition as that the



right cord is going over and is getting into opposition with the left cord when he speaks.

Replying to an inquiry concerning the cause of the paralysis, Dr. White said that it was due to an involvement of the nerve. The X-ray examination showed nothing so far as the possibility of aneurism was concerned. There was some thickening about the upper lobes of both lungs but not enough to cause any such disturbance. The heart examination showed nothing, and the patient never complained of any cardiac or other condition. A diagnosis of a specific condition was made. Garland and White\* analyzed nine cases of recurrent laryngeal nerve paralysis, associated with mitral stenosis; 61 other cases have been reported. That is a mechanical condition, but this patient had no cardiac lesion whatever.

**Traumatic Stenosis of the Larynx. Second Presentation. Moving Pictures Showing Method of Dilatation. (Second Presentation.) Dr. Francis W. White.**

A year and a half ago this patient attempted to commit suicide by cutting his throat. He was rushed to a hospital and a primary suturing of the wound was performed, excepting for the space left for the tracheotomy tube which remained in place three days. A month later, he was suddenly attacked with severe dyspnea and fell to the sidewalk unconscious. Again he was rushed to a hospital and a tracheotomy under local anesthesia was performed. About three months after his suicidal attempt he was admitted to the Manhattan Eye, Ear, and Throat Hospital with an infected tracheotomy wound and markedly stenosed larynx and trachea. As soon as the acute inflammatory condition abated, dilatation of the larynx and trachea was undertaken by means of metal applicators.

On January 8, 1920, a thyrotomy was performed under general anesthesia and a considerable amount of fibrous and granulation tissue within the trachea and larynx was removed. No sutures were used to coaptate the edges of the thyroid cartilage, the idea being that a condition of pseudarthrosis or false joint would obtain. A considerable portion of the cartilaginous rings anteriorly below the thyroid were found to be missing, due doubtless to the frequent severings already mentioned and the resulting inflammatory reactions. The loss of cartilaginous substance explained the sucking-in of this portion of the neck when the patient tried to inspire with the tracheotomy wound occluded. As soon as practicable after the thyrotomy, dilatation of the larynx and trachea was resumed with the use of intubation tubes which were not left in situ; then constant expansive dilatation was instituted by means of a piece of No. 16 French catheter doubled upon itself, as explained when this patient was first presented.

DISCUSSION.

Dr. McCULLAGH said that he had seen the patient recently and he was in very good shape and had a comparatively good speaking voice.

Dr. FORBES: How long was it necessary to keep up the dilatation?

Dr. WHITE replied that he had kept it up for about two months. It was a very disconcerting case, and discouraging case as improvement was so slow. Today he has as clear a voice as the other laryngeal case just presented. He has a big deep base voice; whereas before he could only speak one or two words by holding his finger over the tracheotomy wound. The tube has been entirely removed.

**Five Cases of Foreign Body In the Lung and Esophagus. Dr. J. D. Kernan, Jr.**

First I would like to say a word about anesthesia, and next about the habit of lay persons and many physicians of poking into the throat after

\*Jour. A. M. A., Vol. 75, No. 17, Page 1159.

foreign bodies; and then in regard to certain teeth plates that are used which slip down the throat very easily. It ought to be widely advertised that such plates are dangerous; I have a very nice collection of them.

A word as to anesthesia: We all know that an esophageal tube can be introduced without anesthesia, as can the the bronchoscope, but sometimes it is not advisable; and when I think it advisable to use it I always do so. I cannot use the judgment of any one else on that point.

The first patient was 45 years old, an epileptic, and during a fit she inhaled her false teeth. You will notice there is scarcely any attachment to hold them in the mouth, and there are these two sharp prongs. That slipped down the throat with the sharp points down, and her brother and sister helped it down while trying to get it out, and jammed the prongs in. In this case, considering the sharp foreign body and the spasm of the esophagus, I used ether. The esophagus was found to be very much lacerated on one side and there was some difficulty in removing the foreign body. Then the patient was put to bed and starved for about five days—nothing by mouth, and given water by the rectum. Under this treatment, on the sixth day she developed delusions of persecution and became violent at night, and finally was transferred to Bellevue. There, by my advice, they allowed feeding. She was discharged after another six days, and on Thanksgiving I had a letter from her saying that she had eaten her first solid food.

I had another patient with a loose tooth plate of the same character, this time a man. I started to get it out without anesthesia, and found the esophagus so spastic that I could not introduce the tube; so I gave him an anesthetic and took it out promptly.

The third case had a safety pin in the esophagus. I have had altogether six cases of safety pin in the esophagus and have gotten out five. The sixth pin was so far down that as I did not have a turning forceps I shoved it down into the stomach and it was passed out in thirty-six hours. This child swallowed an open safety pin and the mother at once took it to the hospital. The doctor there declared that the child could not be so comfortable as it was if it had a safety pin in its throat, but the mother insisted that the child had swallowed one. Then the doctor poked his finger in the throat and after that sent her to the Manhattan, saying that the safety pin was there point downward, for he could feel the ring. When I introduced the speculum, I found the point upward. He had succeeded in shoving it far down, and I could not get it out easily. That child was fifteen months old.

In one case there was a locket in the esophagus, and the child was taken to one of the large city hospitals. When I asked the house surgeon how he knew the locket was still in the esophagus he replied that all the house staff had felt it there. They had succeeded in jamming it down very firmly and it was difficult to get it out.

The next case was that of a baby a year old, who had sucked into the trachea the celluloid foot of a bath doll, where it was bobbing up and down. It was removed after considerable difficulty for the child was only a year old and had a very small larynx. It was difficult to get the tube in at all, and then to see this small body. I finally got it with the aid of a laryngeal speculum, and when the child coughed I caught this up in the forceps and removed it.

The next case shows the evil of giving anesthesia. This patient was a motorman of about fifty, who reported that fifteen years before his admission to Bellevue last summer a friend had slapped him on the back while he was holding a dime in his mouth, and he felt it rattling around in eustachia. He said that for fifteen years it had never given him any trouble until about two years previously when he had a severe hem-

orrhage and was laid up for two months. He was in the hospital for two weeks before I saw him. Accepting his story of the dime, an X-ray picture was taken, and it was seen in the left bronchus, looking as big as an apple. At first we simply cocaineized him, but he begged for ether and said he could never stand it without an anesthetic; so as I expected some difficulty from granulations and stricture I gave in and ether was administered. As I expected, I found a mass of granulations which bled freely, and as I was mopping it with adrenalin and cutting away with the forceps, the patient died. We could never get him to breathe at all, but he seemed to fill up with blood and drowned in his own blood, in spite of all measures that we could use for resuscitation, including one that I had never seen before, the injection of adrenalin directly into the heart. The attending physician suggested that two or three minutes after the heart had ceased to beat; immediately the heart started a vigorous beating which continued for several minutes, but we could not get him to breathe again.

The point I wished to make about these cases is that in certain instances, especially those involving the esophagus, it is the part of wisdom to give an anesthetic in order to avoid trauma and make the removal easier, and the judgment in such cases must be left to the operating surgeon. (By the way, in the last case, the dime was removed very easily.)

In the next case, is there any way in which we can teach lay persons and even physicians, to accept seriously stories of foreign bodies swallowed by children, and not to poke at them with the fingers; and is there any way in which we can direct the attention of dentists to the dangerous character of partially secured tooth plates

#### DISCUSSION.

DR. HUBBARD inquired about the strength of the adrenalin injection into the heart.

DR. KE. NAN replied that it was 15 minims of a 1-1000 solution.

DR. FORBES said he did not see why the average house man in the hospitals, is not better trained in regard to the danger of poking in the throat, even though the laity are not. It is not at all uncommon for some of the men in the hospitals to attempt to remove a foreign body with the finger. He then cited the case of a longshoreman who with his turkey hash had swallowed a piece of the breastbone of a turkey. He went to a hospital in an adjacent town, and there the house man proceeded to pass a bristle bougie with which he caught the bone, but could not pull it out; and then the longshoreman himself caught hold and together they pulled at it. Foreign body remaining. When a man in the hospital will do such a thing it shows a lack of instruction for the undergraduates and those taking courses in the hospitals. Fortunately, the man was referred to a special hospital, came to me at the Post-Graduate Hospital, and though no anesthetic was used the foreign body was successfully removed.

A great many cases of foreign bodies due to dental origin have been reported owing to lack of proper care either at the time of ordinary dental work or during the extraction of teeth under general anesthesia; this, I think, should be brought to the attention of the dentists as well as the general practitioner, who sees this case and often overlooks the history of a possible foreign body.

DR. LEDERMAN reported the case of a physician who went to a dentist and received treatment for some affection of root canals. The dentist employed a finger brooch to remove the inert pulp, and while doing this the instrument slipped from his grasp and disappeared. At the time,

the dentist thought the brooch had fallen to the floor, but it could not be found. In about six weeks, the doctor had an occasional spasmodic cough, which was not very annoying. About this time while having an X-ray examination, lying down with his feet elevated, he had another severe attack of coughing, and coughed up the brooch. This was the second instance of this kind that had been reported. The other case resulted in the death of a wealthy man in the city, following the entrance of some dental instrument into the bronchi. Such things do happen, and the dentists should be more careful and should use some form of protection while employing these small instruments in the mouth.

Dr. McTIERNAN told of a case that occurred in his service last winter. He was using a curette to remove adenoid tissue in the naso-pharynx. The instrument was observed after the adenoidectomy and the blade was found to have broken during the operation. Ordinarily one would have expected to find the broken blade attached to the adenoid mass, but in this case it was found lodged in the inter-arytenoid space, and was later removed with forceps.

Dr. KERNAN, replying to an inquiry regarding the cause of the death of the patient, said that in his opinion the patient should not have been anesthetized. It was a piece of bad judgment, but he had yielded to the patient's urgent request. The point about not having anesthesia so that the cough of the patient will aid in clearing the lungs is of great value. This patient bled a lot, and his cough reflex was lessened, and in that way the blood remaining in the lung drowned him and stopped his breathing. That seemed to be the only solution. It could not have been due to trauma, for at that time nothing had been seized, the granulations simply being cut away. In these cases it is necessary to avoid general anesthesia whenever possible.

**Rupture of Internal Carotid, Following Tonsillectomy for Peri-tonsillar Abscess. Dr. O. L. Monroe.**

This patient, a young lady, 23 years of age, who gave a history of having had her right tonsil removed under local anesthesia on November 5, 1920, for the relief of peritonsillar abscess. During the following week there were many hemorrhages and on the morning of the seventh day, she was brought to the Manhattan Hospital.

Examination on admission showed a patient very pale, pulse rapid and thready, in fact, in state of collapse. After being given brandy in a rectal saline solution, there was marked improvement in her general condition. At 9 a. m. temperature 103.6°, pulse 120, respiration 22.

Right tonsillar fossa showed a deep sloughing wound from the base of the tongue up to and including the hard palate; there was moderate edema of the surrounding tissue; breath foul; right cervical nodes en-hemorrhages, which were controlled by swabs, saturated with tannic and gallic acid; at noon the temperature was 103.6°, pulse 140, respiration 22.

At about 1:40 p. m. there was a sudden and tremendous gushing of blood from her mouth, which literally made a "pool of blood" in the bed, and in a couple of minutes the patient was pulseless and unconscious. She was rushed to the operating room and a clamp was applied very deep in the wound by Dr. Buckley, who was passing in the corridor at the time of the rupture. At this juncture, I arrived and began an infusion of normal saline and adrenalin, but could not get any return of the pulse, the patient being exsanguinated.

Culture from the wound showed a growth of streptococcus hemolyticus and staphylococcus albus.

There was no autopsy.

## DISCUSSION.

DR. HAYS said that he hardly thought it advisable to report this case as one of rupture of the internal carotid as no autopsy had been performed. A close study of the anatomy of the tonsil and the surrounding regions will acquaint one with the fact that the internal carotid is a considerable distance away and that it is almost impossible to injure it. Of course there may be large aberrant vessels which may rupture and give a profuse enough hemorrhage to make one believe that the bleeding comes from the carotid. In normal cases, the only large vessel which reaches the tonsil is an ascending branch of the superior laryngeal but there may also be large branches of the internal maxillary. In a case where there is as much sloughing as here reported, any large vessel may become eroded, giving a hemorrhage which may cause death.

Dr. Hays said that some years ago he had written a paper on peritonsillar abscess in which he stated that although a number of deaths were supposed to have occurred from rupture of the carotid artery, there was no report of such a death in the literature. He was of the opinion that the rupture of a large vessel did occur at the time of the opening of the abscess cavity the walls of which had become thinned so that the vessel burst when the tension of the abscess was relieved. The same thing might have happened in this case. At all events it was hard for him to believe that the internal carotid artery was at fault in this case.

Dr. MacKENTY agreed with what Dr. Hays had said. In doing some anatomical work some years previously he had been surprised of the great distance between the carotid arteries and the bottom of the tonsillar fossa, and had made up his mind that it would not be possible to wound them in taking out the tonsils. Such a diagnosis should not be made without an autopsy. Not only that, but if the hemorrhage had been from the carotid death would have been so rapid that there would have been no time to do anything, and evidently some efforts had been made.

Dr. KERNAN said he had no particular interest as to whether or not this was a rupture of the carotid artery, but it might very well have been. He had recently reported a case of peritonsillar abscess about the great vessels of the neck and thrombosis of the internal jugular vein which resulted in the death of the patient. Dr. Monroe's case was a case of peritonsillar abscess, and it might very well be that before the operation or after it the sloughing had gone on, as in the case he himself had reported, to perforate the pharyngeal muscles and to reach the large vessels. The patient did die in a minute, like the snap of your finger, and the amount of blood discharged in that short time was as that only a very large vessel could give vent to. It might be that the aberrant vessel mentioned by Dr. Hays may have sloughed, though it seemed rather doubtful. He knew from the case he himself had presented that it was entirely possible for the sloughing process to reach the carotid vessels.

Dr. HUBBARD asked if he was correct in understanding Dr. Monroe to say that the tonsil was removed for the cure of the peritonsillar abscess and to prevent the recurrence of the attack? Was the removal of the tonsils during an acute attack or was it between the attacks?

Dr. MONROE, in closing the discussion said that the original operation on this patient was not performed by any Manhattan operator. The operation was done during an attack of quinsy, and the hemorrhage that occurred was such that it could only have come from an enormous artery. He had seen many tonsillar hemorrhages that were big, but had never seen such a patient die in a minute, where a quart of blood gushed out. The amount was much larger than any aberrant vessel could have sup-



plied. On the operating table he observed that the wound was the deepest he had ever seen in the throat, it was about two inches in depth. The patient's father, who was a physician, was present, and had put in a swab as fast as he could. Dr. Bulkley pulled out the sponge, and the blood gushed out, and he clamped something and tried to stop the hemorrhage, and said that the clamp was way down where you would expect the internal carotid to be. It was regrettable that an autopsy was not performed to prove the case; however, I feel sure that it was the internal carotid that had been involved in the slough.

**The X-Ray Treatment of Adenoids and Tonsils. Dr. W. D. Witherbee.**

DISCUSSION.

Dr. HAYS expressed the opinion that such a paper should be discussed very thoroughly, not only from the standpoint of X-ray therapists but by the laryngologists who would probably find that the report just made would prove invaluable in a great many cases. Up to a few months previously he had not himself heard of Dr. Witherbee's work, and then fortunately, a patient came under observation, a young lady, who was supposed to have had her tonsils removed twice, but still had a small piece of tonsillar tissue left on the right side. It seemed undesirable to do any further work of an operative nature. Having just about that time heard about this X-ray therapy and knowing Dr. John Remer, he took the young lady to him, and within the last month she had had two treatments with very amazing results. The tonsillar tissue, which had constantly become infected, had almost entirely disappeared, and there was now no sign of infection; not only that, but the mental and physical condition of the patient had greatly improved also.

Since then, he had had six other cases which warranted X-ray treatment. The laryngologist must, however, use great discrimination in deciding which cases should be operated upon and which should be treated by the X-ray. A discrimination must be carefully made for a number of reasons. In the first place, there are many who will say that all tonsils should be removed, and others who will say that all tonsils should be treated by X-ray. While all know that much harm has been done by the indiscriminate removal of tonsils, it is very certain that the indiscriminate X-ray treatment of these cases by all sorts of men will have much worse results. The man who is giving X-ray treatments regularly will probably give proper X-ray therapy to the tonsils, but any man who will undertake to treat all tonsils that way, will have many serious results in the shape of burns and other sequelae. Patients over forty-five years of age suffering from focal or definite infections of the nose and throat, including polypoid condition of the inferior turbinates posteriorly causing deafness, should have the benefit of R-ray treatment before operation. Needless to say, patients suffering from systemic disease which would make it dangerous to operate, should have X-ray treatment. In the last six cases that have been treated in this way by Dr. Phillips, an associate, the results have been encouraging. They have changed in size and appearance, and, better than that, every patient is most enthusiastic about the treatment; most of them were rheumatic and they claim they feel better than they have done for some time.

The treatment will doubtless also prove valuable in another class of cases, patients before the age of puberty, where the tonsils have been removed, and yet where there are recurrent infections of glands on the pharyngeal wall. These cases are very distressing; the patients run a temperature very easily, and get up a cervical adenitis. Such cases should respond well to X-ray treatment. Dr. Hays then cited the case of a patient, a boy of ten, who is having this treatment and whose throat seemed to be clearing up very satisfactorily.



This work has been going on only since December, 1919, and we are not yet in position to judge the ultimate results of the throat. Dr. Witherbee had mentioned a dryness in the throat after treatment, and the direct effect on the lymphatic tissues. There is necessarily a certain amount of lymphatic drainage in the throat, and whether or not that will be interfered with permanently, remains to be seen. Further careful observation seems most necessary.

Dr. PRATT said he had had the opportunity of seeing cases which had been treated by X-rays. One patient was a man of fifty, seen on July 1, who gave a history of rheumatic pains in both shoulders for the past year. He had large, spongy tonsils with crypts filled with milky secretion, a culture of which showed streptococcus viridens. He was advised to have a tonsillectomy performed. He was, however, a very obese man, weighing about 260 pounds, and was very averse to having an operation and had read about X-ray therapy. Accordingly, on July 5, he had one X-ray treatment, and others on August 10 and 25. He was not seen again until October 27, at which time he still complained of rheumatic pains in the shoulders. The tonsils were slightly reduced in size, but a culture again showed streptococcus viridens. He was again advised to have a tonsillectomy performed and a date was set for the operation. Coming to the office three days prior to that, he complained of pain in his right shoulder, and the throat examination showed a large swelling in the glosso-epiglottic fold. As soon as the swelling went down a second date was set for the tonsillectomy, but again the swelling occurred and again the operation was deferred.

A second case was that of a young man with recurrent sore throat and general malaise. On October 25 he had a massive dose of radio-therapy. His condition did not improve and when he was again seen, on December 2, 1920, a culture showed streptococcus viridens and aureus. He brought a letter from his family physician, saying that while his tonsils were smaller he thought the tonsillar nodes were more distinct than they were before.

A third patient had his tonsils removed but had large masses of tonsillar tissue on the lateral walls behind the pillars. He had had a chronic otitis media for a long time and it was hoped that if the lymphoid tissue could be reduced by radio-therapy that this might have some effect on the otitis media, but two treatments produced no gross changes in the tissue, nor in the otitis media.

Dr. Pratt said that one point that especially impressed him was, as he understood it, Dr. Witherbee's statement that so far as had been observed the effect of the X-rays had been to reduce the size of the tonsil. It seemed difficult to understand the importance of reducing the size of the tonsil unless the crypts were obliterated, since it is in the crypts that the secretion lodges and not the surface. He understood that the cultures in Dr. Witherbee's cases had been taken by plunging a platinum loop into one of the crypts. This method, he thought, gave very unreliable data. The only way one can obtain satisfactory cultures from tonsils is to make pressure on the anterior pillar with a stiff right angled probe, thus exposing material from the depths of the crypts.

As Dr. Hays had stated, this treatment is still in the experimental stage and one should not jump at the value of the results from this therapy simply from the reduction in the size of the tonsils or because a negative culture is obtained from the surface of the tonsil after X-ray treatment.

Dr. HUBBARD said he wished to bring to the attention of the members a point that had been suggested by Dr. Witherbee, the pictures showing the square surfaces exposed to the X-rays. One of these pretty well occupied the area of the ear. If he was correct in supposing that the X-rays

used for this therapeutic purpose are of equal strength to those used for taking pictures of the mastoid, and tonsils have been present before, why are not the tonsils similarly affected? I don't think they are. I am asking for information.

Dr. KERNAN expressed pleasure in Dr. Witherbee's statement that the paper represented experimental work. He had reported the results of 60 cases, which represented hardly a day's work at a busy tonsil hospital. All have seen tonsils which filled the throat when first seen, and when the patients came a month later for their removal they were reduced in size to such an extent that one would be almost ashamed to remove them. The mere matter of reduction did not count a bit. The question of time: a year is nothing. All know that tonsils may remain quiescent for ten or fifteen years.

Dr. WITHERBEE, in closing the discussion, said he had tried to make clear the fact that this work was still in the experimental stage and that much remains to be done in regard to it. So far as the X-ray effects on lymphatic tissue is concerned, this principle has been known and studied for some years.

In X-ray treatment, the dosage is all-important, and one point applies to all doses. If a dose is given overnight and another one two weeks later, the normal cells will have time to recover and the pathological cells will not. If the proper dose is repeated every two weeks, the pathological cells will be destroyed while the normal cells will remain unharmed.

In regard to the cases that have been reported: One man reported a case that had been treated only twice. Dr. Withersbee stated that in the first case reported in the paper, he did not see any change for five weeks, and if a case has had only two doses one seldom sees a change then. It is only after the third or fourth treatment that we look for the earliest X-ray effect.

So far as reduction is concerned, if one observes the tonsils themselves and then notes the effect, the difference is marked. If nature alone causes shrinkage of the tonsils, the microscopical evidence after X-ray treatment of lymphoid tissue is to say the least, most convincing.

In regard to the effect on the other tissues, the explanation of the lessened resistance of the pathological cells as compared with the normal cells would seem to do away with that.

As to objections in regard to the other glandular elements in the neck: If there had been any interference with these, why has there not been a long list of complications during the past 15 years in those cases of ringworm of the scalp in children that receive five doses on the head in one treatment? Also, it should be pointed out that the filtered dose of X-ray used in the treatment of tonsils is one-quarter of that used in ringworm of the scalp.

